Appendix D
Point Source Modeling Inventory Development

D.1 Base Case Point Source Modeling Inventory Development

The point source emission inventories are composed of information from several databases. The following sections describe the base case point source emission inventory development for the HGB and BPA August-September 2000 modeling episodes.

Texas Point Sources

For Texas point sources, data from the TCEQ Point Source Data Base (PSDB) provided the basis for modeling the 2000 base case episode. As previously developed, the Texas point source EI was divided into Electric Generating Units (EGUs) and non-EGUs (NEGUs), which were processed as separate files. The EGU portion of the Texas point source EI was supplemented with hourly data from EPA's Acid Rain Program Database (ARPDB). Upon completion of a PSDB-to-ARPDB cross reference, ozone-season daily PSDB emission records were replaced with hourly ARPDB emission rates for each day of the modeled episode. The Texas inventory was also supplemented with hourly data obtained via the TexAQS 2000 Special Inventory and with additional information from the TCEQ Region 12 Upset/Maintenance Database.

An elementary chart illustrating typical data preparation flow is presented as Figure D.1. All emissions were processed with ENVIRON's EPS2x software suite. A typical EPS2x processing stream is presented as Figure D.2.

Figure 1: Typical Texas Point Source Data Preparation Flow Chart

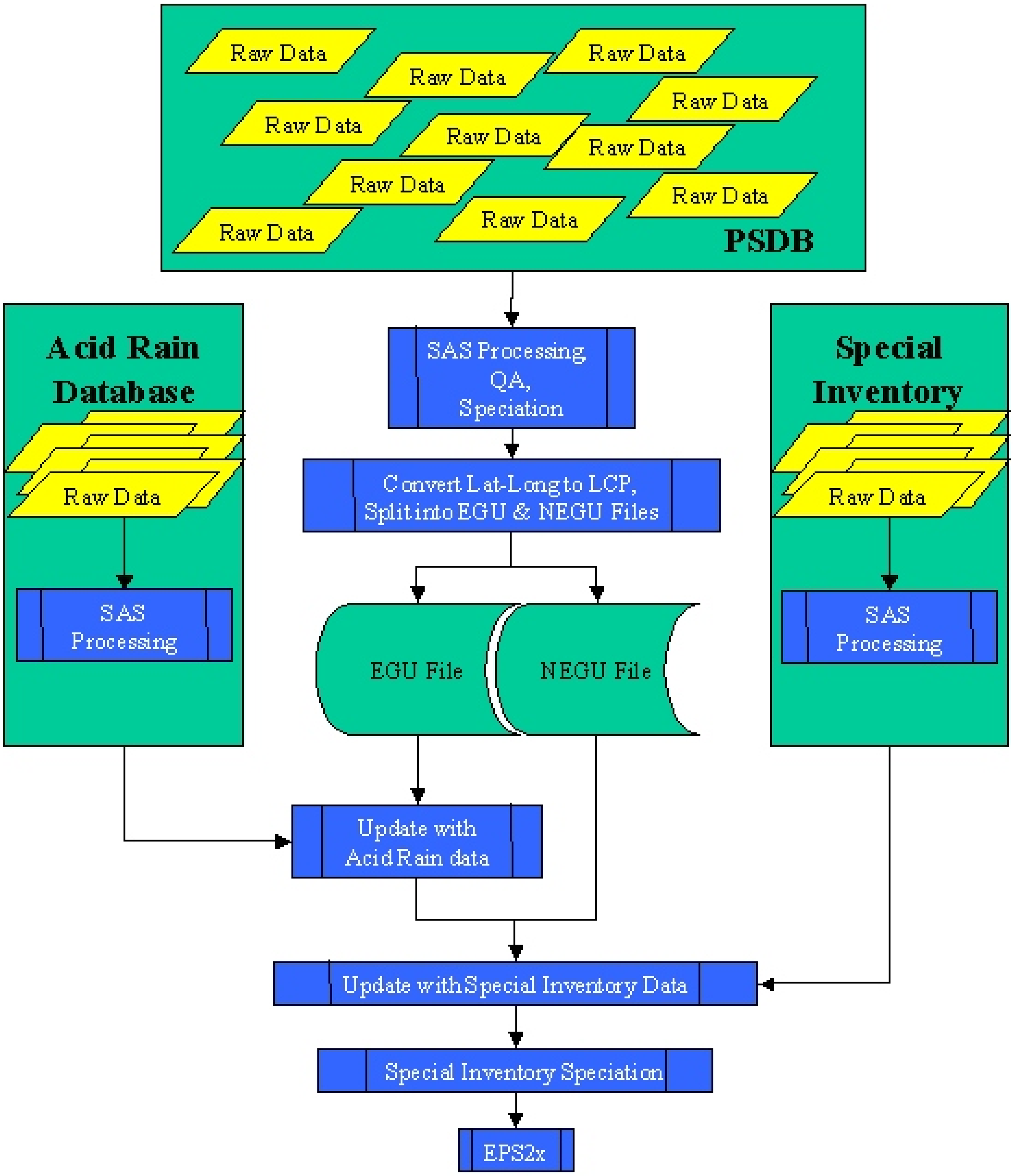
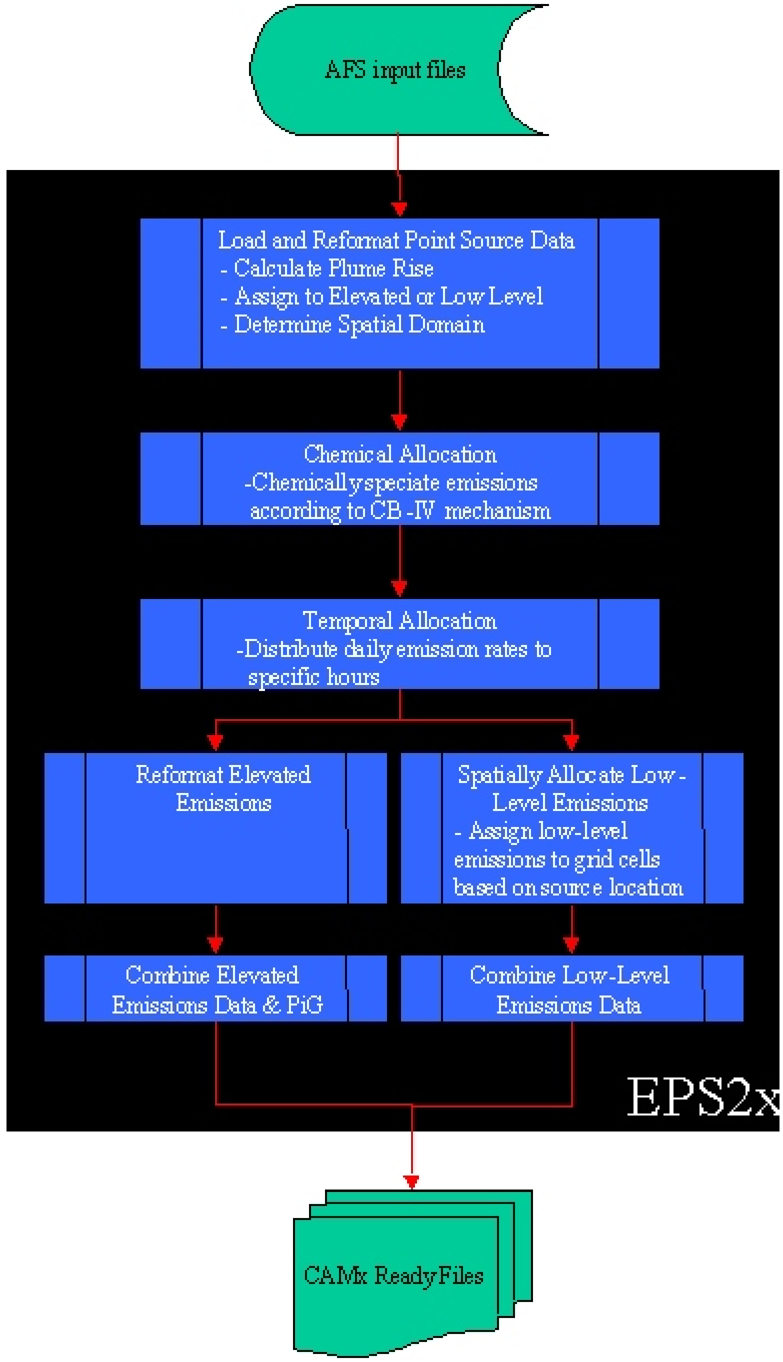


Figure 2: Typical Point Source EPS2x Processing Stream



Texas Point Source Database
Annual Emission Inventory Questionnaire data are collected and quality assured by TCEQ Industrial Emissions Assessment staff. The data are stored electronically as multiple tables in a relational database. Modeling staff extract the necessary tables from PSDB via specially-written queries and combine the data using the SAS® analytical/programming software. The data is further quality-assured by modeling staff and compared to Emissions Inventory staff query results. Some of the parameters examined by modeling staff include geographic location, height above ground, exit diameter, exit velocity, exit temperature, and Ozone Season Daily emission rates. Ozone Season Daily emission rates are calculated for those emission points for which none were reported using annual emission rates and seasonal equipment throughput data. All location data is converted to a Lambert Conformal Projection system for modeling.

Acid Rain Database
In order to improve temporal allocation and accuracy of emission rates, modeling staff obtained EPA Acid Rain Program from EPA's Clean Air Markets website. The data, referred to as "Raw Data" is formatted according to EPA's Electronic Data Reporting (EDR) guidelines and stored in a compressed electronic format. Modeling staff obtained the necessary files and programs to decompress the data and decipher the column specific ASCII data files. Samples of the Acid Rain Program Raw data are given as Figures D.3 and D.4.

Figure 3: *Acid Rain Program Raw Data, Sample 1*

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10000732532000V2.1
102SAN JACINTO SES TX0918946 TX0001519560 COGENERATION
4911TX201 2930000945430
201SJS2 210N2000070100 9.401
201SJS2 210N2000070101 9.501
201SJS2 210N2000070102 9.501
201SJS2 210N2000070103 9.501
201SJS2 210N2000070104 9.501
201SJS2 210N2000070105 9.501
```

Figure 4: *Acid Rain Program Raw Data, Sample 2*

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10005509832000V2.1
1012 CO2MASS3302187
1012 DILUENT2112143
1012 GASRATE3032186
1012 NOXCONC2012143
1012 NOXRATE3202187
1012 OPERATN3002208
1012 QTRSUMM301 1
1012 SO2MASS3142186
102FRONTERA 0000088003084821500084 ELECTRIC UTILITY 4911TX215 2612300982348
2012 A2121100070100 6.301
2012 A2121100070101 5.901
```

These data were reviewed, processed, put into a useful format, and incorporated into the base case inventory by TCEQ modeling staff. To facilitate the incorporation of this data, staff created a PSDB-to-ARPDB cross reference which links PSDB stack identifiers to Acid Rain Program boiler identifiers. An excerpt from the Texas PSDB-to-ARPDB is provided as Table D.1.

Table D.1: *Texas PSDB-to-ARPDB Cross Reference Excerpt*

ORISN	BLRID	STACKCONFIG	FIPS	PLANT	STACK	POINT	FIN	EPN	PLNAME	ACCOUNT	COUNTY	OWNER	AREA
3459	1	MS	48361	7	2	2	B1	1A	Sabine	OC0013O	ORANGE	EGS	BPA
3459	1	MS	48361	7	13	2	B1	1B	Sabine	OC0013O	ORANGE	EGS	BPA
3459	2	MS	48361	7	3	3	B2	2A	Sabine	OC0013O	ORANGE	EGS	BPA
3459	2	MS	48361	7	14	3	B2	2B	Sabine	OC0013O	ORANGE	EGS	BPA
3459	3	MS	48361	7	4	4	B3	3A	Sabine	OC0013O	ORANGE	EGS	BPA
3459	3	MS	48361	7	15	4	B3	3B	Sabine	OC0013O	ORANGE	EGS	BPA
3459	4		48361	7	5	5	B4	4	Sabine	OC0013O	ORANGE	EGS	BPA
3459	5		48361	7	6	6	B5	5	Sabine	OC0013O	ORANGE	EGS	BPA
55104	SAB-1		48361	57	1	1	SAB-1	SAB-1	Sabine Cogen	OC0363H	ORANGE	SACLP	BPA
55104	SAB-2		48361	57	2	2	SAB-2	SAB-2	Sabine Cogen	OC0363H	ORANGE	SACLP	BPA
3468	SRB1	MS	48201	41	3	3	1	SRB1A	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB1	MS	48201	41	24	3	1	SRB1B	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB2	MS	48201	41	5	4	2	SRB2A	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB2	MS	48201	41	25	4	2	SRB2B	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB3	MS	48201	41	7	5	3	SRB3A	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB3	MS	48201	41	8	5	3	SRB3B	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB4	MS	48201	41	9	6	4	SRB4A	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3468	SRB4	MS	48201	41	10	6	4	SRB4B	Sam Bertron	HG0358Q	HARRIS	RHLP	HG
3508	1	MS	48147	1	1	1	VA-B1	VA-B1SA	Valley	FB0025U	FANNIN	TXU	ETX
3508	1	MS	48147	1	2	1	VA-B1	VA-B1SB	Valley	FB0025U	FANNIN	TXU	ETX
3508	2		48147	1	3	2	VA-B2	VA-B2S	Valley	FB0025U	FANNIN	TXU	ETX
3508	3		48147	1	5	4	VA-B3	VA-B3S	Valley	FB0025U	FANNIN	TXU	ETX
3470	WAP1	MS	48157	5	23	2	1	WAP1A	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP1	MS	48157	5	65	2	1	WAP1B	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP2	MS	48157	5	24	3	2	WAP2A	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP2	MS	48157	5	66	3	2	WAP2B	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP3	MS	48157	5	44	4	3	WAP3A	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP3	MS	48157	5	67	4	3	WAP3B	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP4		48157	5	26	5	4	WAP4	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP5		48157	5	6	6	5	WAP5	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP6		48157	5	7	7	6	WAP6	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP7		48157	5	8	8	7	WAP7	W A Parish	FG0020V	FORT BEND	RHLP	HG
3470	WAP8		48157	5	18	14	8	WAP8	W A Parish	FG0020V	FORT BEND	RHLP	HG

Special Inventory
Episode day- and hour-specific point source emissions data were collected by surveying the largest 83 sources (see Table D.2) of NO_X and VOC emissions in the HGB and BPA areas, to account for specific operating conditions, upsets, start-ups, and shut-downs during the TexAQS 2000 study period. Sources emitting at least 250 tons per year of non-methane organic compounds (NMOC) or 1000 tons per year of NO_X were requested to participate in the survey. A total of 83 TCEQ accounts were queried. Special Inventory data have been incorporated into the current base case modeling episode. Samples of the data collected are presented in Figures D.5 and D.6.

Figure 5: *Sample Emission Rates Submitted as Special Inventory Data, Example 1*

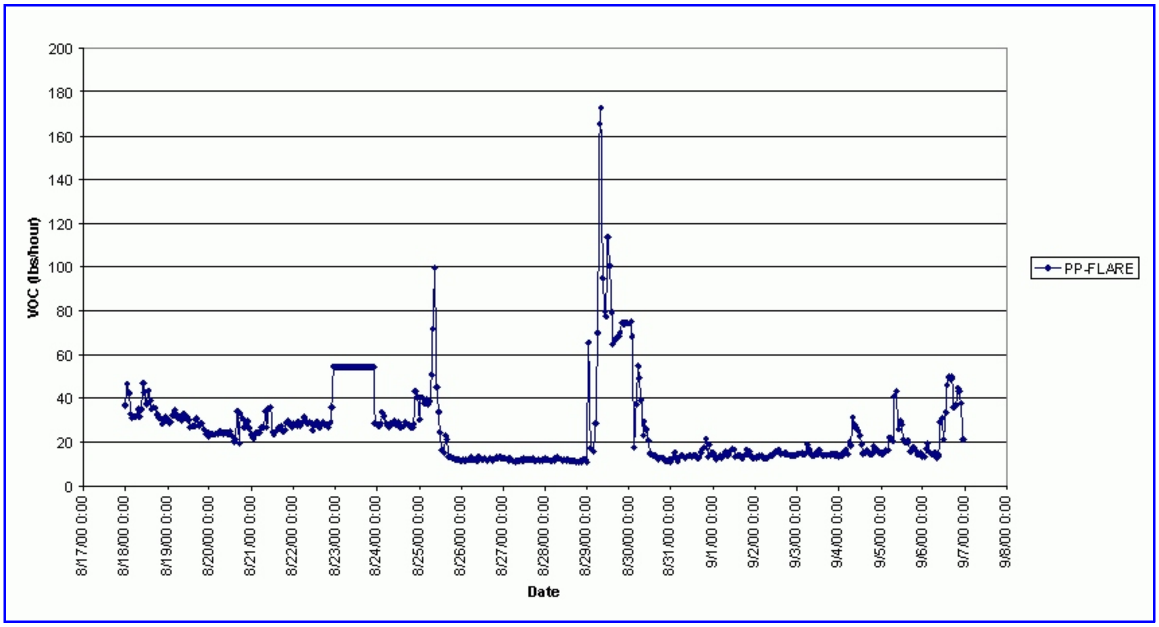
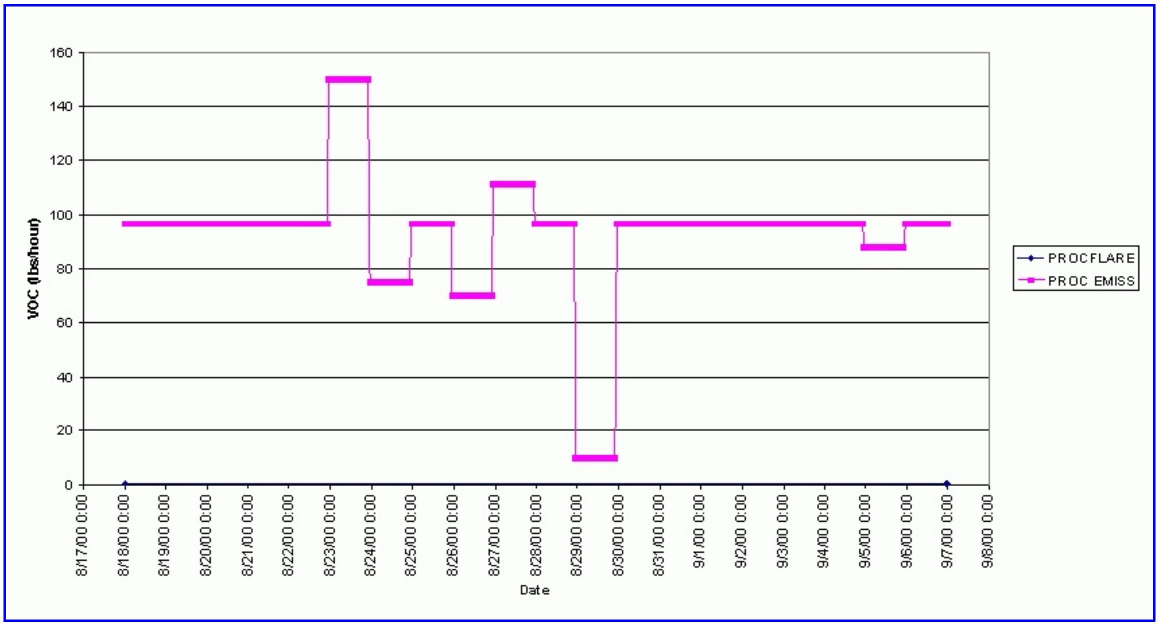


Figure 6: *Sample Emission Rates Submitted as Special Inventory Data, Example 2*



Special Inventory data collection was carried out in two Phases. The Phase I survey asked companies to report hourly emissions data related to deviations from routine operations during the reporting period of August 20 to September 6, 2000.

Review of the data received during Phase I indicated that upset, maintenance, start-up, and shutdown data may not have been adequately reported by all companies. As a result, all participants in the study were asked to review their upset, maintenance, start-up, and shutdown data that had either been previously submitted to the Commission or maintained privately at their site. The Commission also requested that companies provide hourly NO_X emissions associated with the flaring of any upset, maintenance, start-up, or shutdown events. The days of interest were expanded to the period of August 15 to September 15, 2000 to correspond with the entire TexAQS 2000 period.

Table D.2: *Companies Participating in TXAQS2000 Special Inventory*

NUMBER	ACCOUNT	COMPANY	SITENAME	Phase I	Phase II
1	BL0002S	AMOCO CHEMICAL COMPANY	CHOCOLATE BAYOU PLANT	N	Y
2	BL0004O	TRI-UNION DEVELOPMENT CORP	HASTINGS GAS PROCESS PLAN	N	N
3	BL0021O	BASF CORPORATION	FREEPORT SITE	Y	Y
4	BL0022M	THE DOW CHEMICAL COMPANY	PLANT A	N	Y
5	BL0023K	THE DOW CHEMICAL COMPANY	OYSTER CREEK	N	Y
6	BL0038U	SOLUTIA INC.	SOLUTIA CHOCOLATE BAYOU P	N	Y
7	BL0042G	PHILLIPS PETROLEUM COMPANY	SWEENY REFINERY/PETROCHEM	Y	Y
8	BL0082R	THE DOW CHEMICAL COMPANY	PLANT B	N	Y
9	BL0238K	TEJAS GAS PIPELINE COMPANY	COMPRESSOR STATION 4	Y	Y
10	BL0268B	EQUISTAR CHEMICALS, L.P.	CHOCOLATE BAYOU POLYMERS	Y	Y
11	BL0622F	SWEENY COGENERATION LTD PARTNERSHIPS	GAS TURBINES	N	Y
12	BL0758C	CHEVRON PHILLIPS	CHEMICAL SWEENY PLANT	N	Y
13	CI0008R	ENTERPRISE PRODUCTS COMPANY	ENTERPRISE PRODUCTS OPER	N	N
14	CI0009P	EXXON CHEMICAL COMPANY	MONT BELVIEU PLASTICS PLT	Y	Y
15	CI0022A	DYNEGY MIDSTREAM SERVICES, LP	MONT BELVIEU PLANT	N	N
16	FG0010B	EXXON CORPORATION	THOMPSON GAS PLANT	N	Y
17	GB0001R	AMOCO CHEMICAL COMPANY	TEXAS CITY PLANT	N	Y
18	GB0004L	AMOCO OIL COMPANY	TEXAS CITY REFINERY	N	Y
19	GB0055R	MARATHON ASHLAND PIPELINE LLC	TEXAS CITY REFINERY	N	Y
20	GB0060B	STERLING CHEMICALS, INC.	TEXAS CITY PLANT	Y	Y
21	GB0073P	VALERO REFINING COMPANY	VALERO REFINING COMPANY	Y	Y
22	GB0076J	UNION CARBIDE CORPORATION	VINYL ACETATE FCLY. NO. 5	Y	Y
23	HG0017W	WILLIAMS TERMINALS HOLDING, LLC	HOUSTON TERMINAL	N	N
24	HG0033B	EQUISTAR CHEMICALS, L.P.	CHANNELVIEW COMPLEX	Y	Y
25	HG0048L	LYONDELL-CITGO REFINING COMPANY LTD.	REDUCT.OF NOX EMISS.CAP	Y	Y
26	HG0071Q	AIR LIQUIDE AMERICA CORPORATION	AIR LIQUIDE BAYPORT COMPL	N	Y
27	HG0126Q	HOECHST CELANESE CHEMICAL GROUP, LTD	CLEAR LAKE PLANT	N	Y

28	HG0129K	SIMPSON PASADENA PAPER COMPANY	PASADENA PULP MILL	N	N
29	HG0130C	VALERO ENERGY CORP.	HOUSTON REFINERY	Y	Y
30	HG0175D	CROWN CENTRAL PETROLEUM CORP	RED BLUFF RD -- PASADENA	Y	Y
31	HG0192D	OXY VINYLS, LP	DEER PARK PLANT--HOUSTON	Y	N
32	HG0194W	OXY VINYLS, LP	BATTLEGROUND PLANT	Y	Y
33	HG0218K	E.I. DU PONT DE NEMOURS & COMPANY	LA PORTE PLANT	Y	Y
34	HG0225N	ALBERMARLE CORP	ALKYLS UNIT	N	N
35	HG0228H	EXXON CHEMICAL COMPANY	BAYTOWN OLEFINS PLANT	Y	Y
36	HG0229F	EXXON CHEMICAL AMERICAS	BAYTOWN CHEMICAL PLANT	Y	Y
37	HG0232Q	EXXON COMPANY, U.S.A.	EXXON MOBIL REFINING/SUPP	Y	Y
38	HG0234M	EXXON CORPORATION	CLEAR LAKE GAS PLANT	Y	Y
39	HG0261J	KINDER MORGAN OPERATING, LP	GATX TERMINAL - PASADENA	Y	N
40	HG0262H	KINDERMORGAN LIQUIDS TERMINALS, LLC	BULK STORAGE TERMINAL	Y	N
41	HG0289K	GOODYEAR TIRE AND RUBBER COMPANY	HOUSTON CHEMICAL PLT	Y	Y
42	HG0310V	CHEVRON CHEMICAL COMPANY	CHEVRON CHEMICAL COMPANY	Y	Y
43	HG0459J	LUBRIZOL CORPORATION	DEER PARK PLANT	Y	Y
44	HG0562P	TEXAS PETROCHEMICALS CORPORATION	TX. PETROCHEMICALS L.P.	Y	Y
45	HG0566H	PHILLIPS CHEMICAL COMPANY	HOUSTON CHEMICAL COMPLEX	N	Y
46	HG0629I	PAKTANK CORPORATION	DEER PARK TERMINAL	Y	N
47	HG0632T	ROHM & HAAS TEXAS INC	ROHM & HAAS TEXAS INCORP	Y	Y
48	HG0659W	SHELL OIL COMPANY	DEER PARK PLANT	Y	Y
49	HG0665E	SOLVAY POLYMERS, INC.	SOLVAY POLYMERS, INC.	Y	Y
50	HG0674D	DONOHUE INDUSTRIES	DONOHUE INDUSTRIES, INC.	N	Y
51	HG0713S	ENRON METHANOL COMPANY	ENRON METHANOL COMPANY	N	Y
52	HG0770G	EQUISTAR CHEMICALS, L.P.	LA PORTE COMPLEX	Y	Y
53	HG0918V	HOUSTON PIPE LINE COMPANY	BAMMEL GASFIELD	N	N
54	HG1016R	GOODMAN MANUFACTURING	GOODMAN MANUFACTURING COR	N	N
55	HG1174V	COGEN. LYONDELL INCORPORATED	CHANNELVIEW PLANT	Y	Y
56	HG1451S	OXY VINYLS, LP	PASADENA P.V.C. PLANT	Y	Y
57	HG1575W	LYONDELL CHEMICAL COMPANY	CHANNELVIEW PLANT	Y	Y

58	HX0055V	AMOCO CHEMICAL COMPANY	PASADENA PLANT	Y	Y
59	HX1726J	MILLENNIUM PETROCHEMICALS	LA PORTE PLANT	N	Y
60	JE0005H	FINA OIL & CHEMICAL COMPANY	PORT ARTHUR REFINERY	N	Y
61	JE0011M	EQUISTAR CHEMICALS, L.P.	PORT ARTHUR PLANT	Y	Y
62	JE0033C	E.I. DU PONT DE NEMOURS & COMPANY	BEAUMONT WORKS	Y	Y
63	JE0039N	GOODYEAR TIRE AND RUBBER COMPANY	WINGSTAY UNIT	Y	Y
64	JE0042B	PREMCOR REFINING GROUP, INC	SMALL THERMAL OXIDIZER	N	Y
65	JE0052V	HUNTSMAN CORPORATION	C4 PLANT	Y	Y
66	JE0062S	MOBIL CHEMICAL COMPANY	OLEFINS/AROMATICS PLANT	N	Y
67	JE0065M	MOBIL CHEMICAL COMPANY	POLYETHYLENE PLANT	Y	Y
68	JE0067I	MOBIL OIL CORPORATION	BEAUMONT REFINERY	Y	Y
69	JE0091L	SUN MARINE TERMINAL	NEDERLAND MARINE TERMINAL	N	Y
70	JE0095D	MOTIVA	PORT ARTHUR PLANT	N	Y
71	JE0111H	UNION OIL COMPANY OF CALIFORNIA	BEAUMONT TERMINAL	N	Y
72	JE0135Q	HUNTSMAN PETROCHEMICAL CORPORATION	AROMATICS & OLEFINS PLANT	Y	Y
73	JE0343H	BEAUMONT METHANOL LTD PARTNERSHIP	BEAUMONT METHANOL, LTD.	N	N
74	JE0508W	CHEVRON CHEMICAL COMPANY	PORT ARTHUR TEXACO PLANT	Y	Y
75	JE0693A	DUPONT DOW ELASTOMERS L.L.C.	BEAUMONT	N	Y
76	MQ0002T	DUKE ENERGY FIELD SERVICES, LP	U.P. RESOURCES CONROE	N	Y
77	MQ0007J	EXXON CORPORATION	CONROE COMPRESSOR STATION	N	Y
78	OC0004P	BAYER CORPORATION	POLYSAR RUBBER DIVISION	Y	Y
79	OC0007J	E.I. DU PONT DE NEMOURS & COMPANY	E.I. DU PONT DE NEMOURS	Y	Y
80	OC0010U	FIRESTONE SYNTHETIC RUBBER & LATEX	ORANGE PLANT	Y	Y
81	OC0012Q	CHEVRON CHEMICAL COMPANY	ORANGE PLANT/OXYGEN SCAVE	N	Y
82	OC0019C	INLAND PAPERBOARD & PACKAGING CO	PULP & PAPER MILL	N	Y
83	WB0003U	EXXON COMPANY	KATY GAS PLANT	N	Y

The special inventory emissions, as submitted, made very little difference in the overall point source inventory. Figure D.7 illustrates the differences between point source emissions before, and after, the incorporation of Special Inventory data over the 2000 modeling episode. This analysis was based on the annual point source inventory, as submitted to the Commission, i.e. no VOC adjustment. Figure D.8 summarizes daily percent increases, from the unadjusted inventory, of NO_X and VOC, due to inclusion of Special Inventory data for August 22 through September 1, 2000. Figure D.9 summarizes the hourly percent increases, from the unadjusted inventory, of NO_X and VOC for August 30, 2000, due to inclusion of Special Inventory data. Figure D.10 summarizes the adjusted HGB modeling inventory VOC emissions by category for August 30; Special inventory emissions account for 4% of the VOC emissions on that day.

Figure 7. *Special Inventory Data Incorporation: NO_X, VOC, and CO*

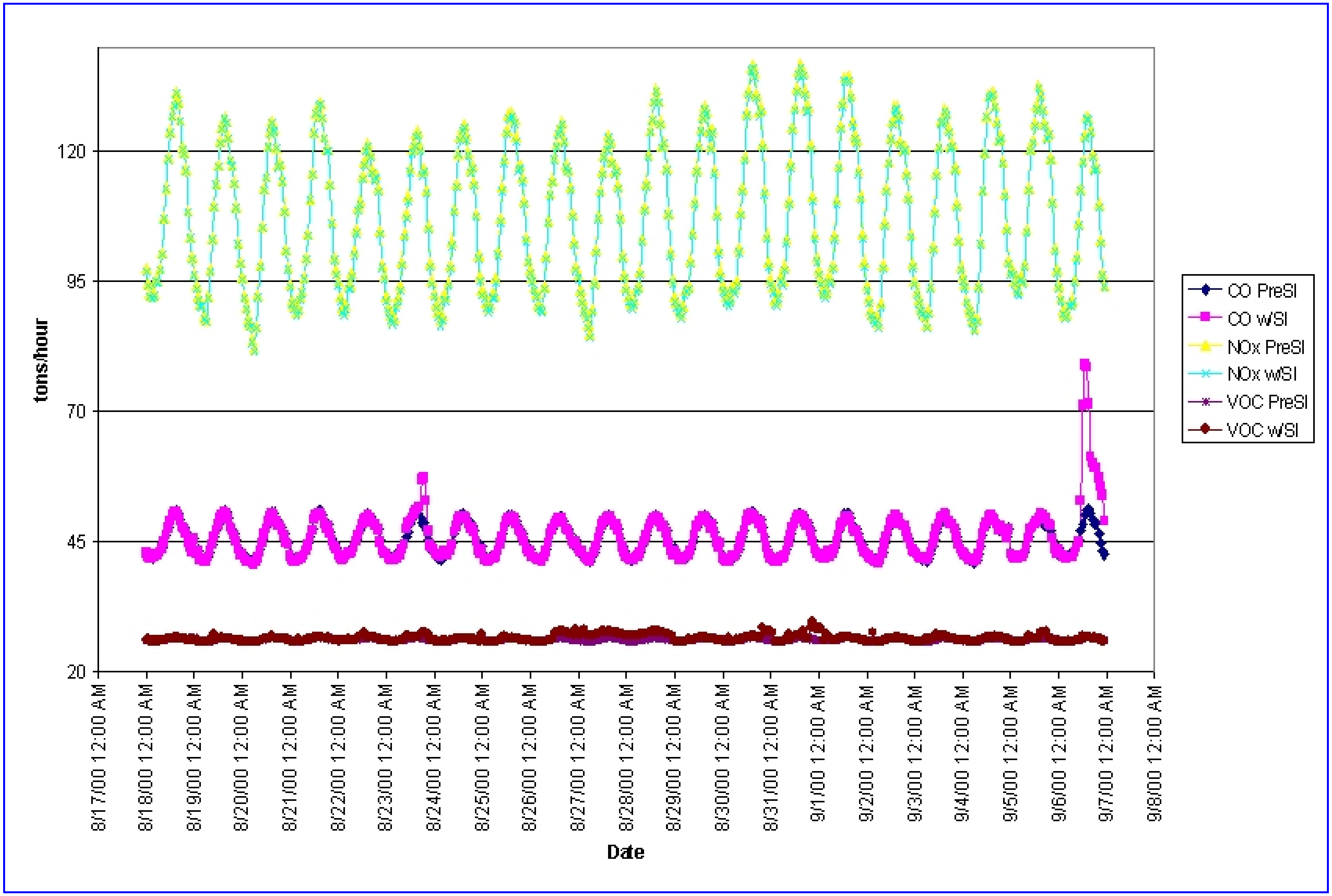


Figure 8. *Daily Percent Increase In Emissions Due to Special Inventory Data*

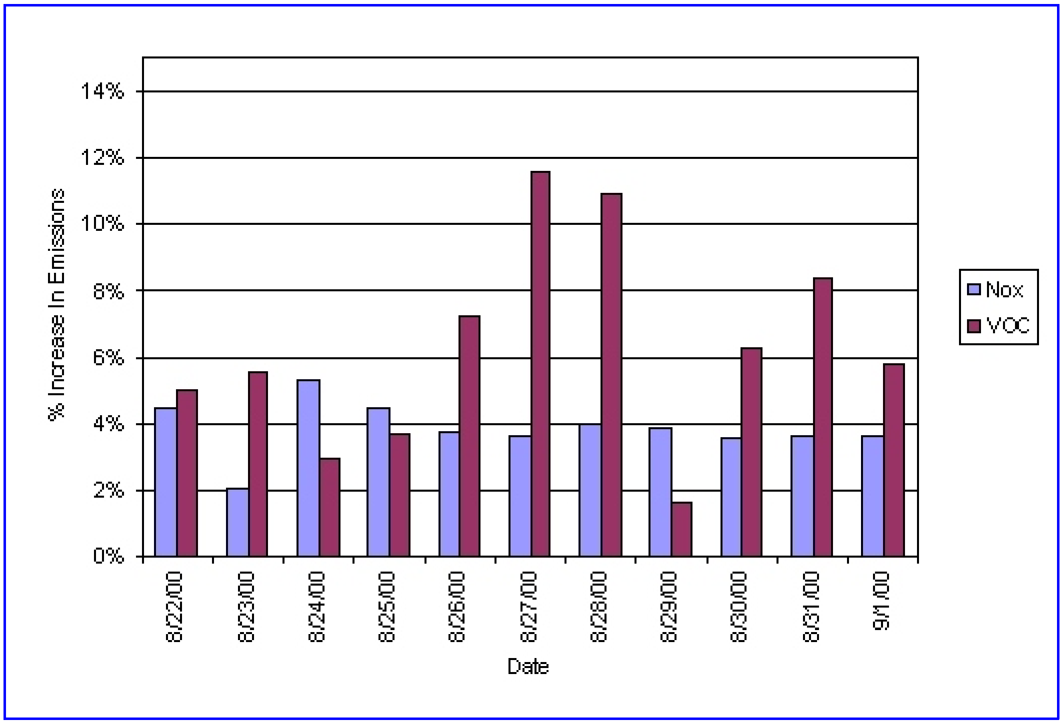


Figure 9. *Percent Increase In Emissions Due to Special Inventory, August 30th*

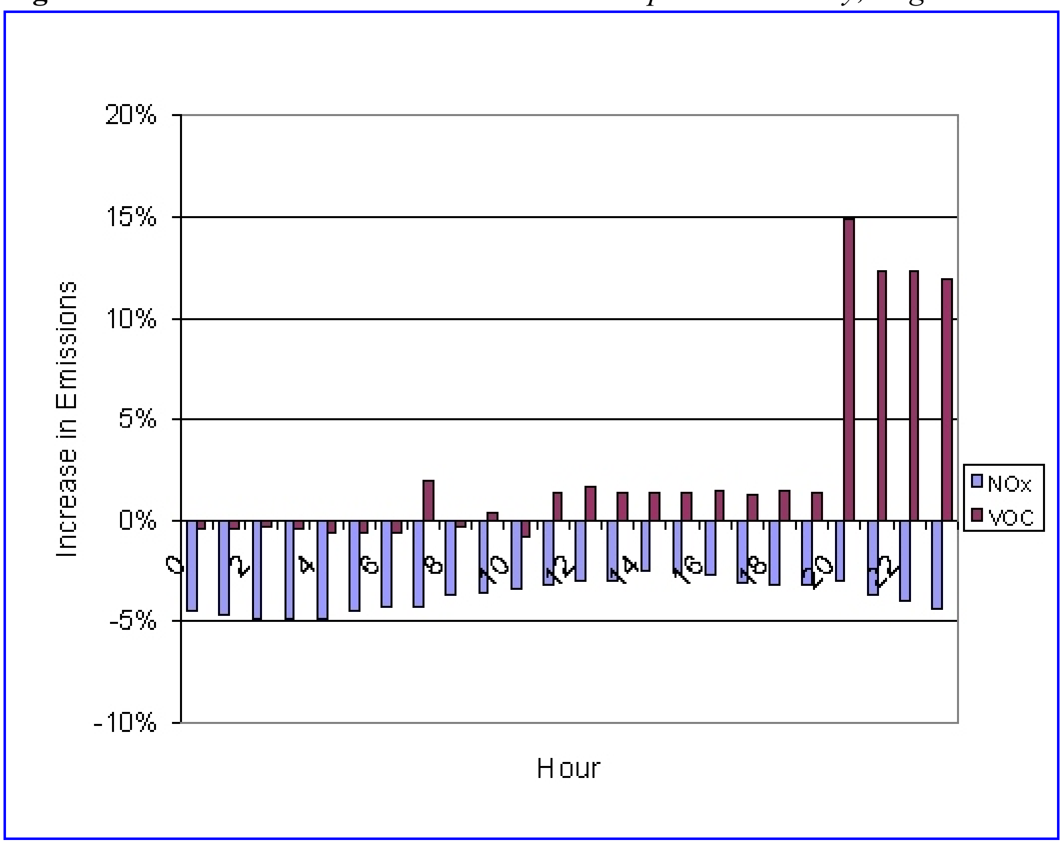
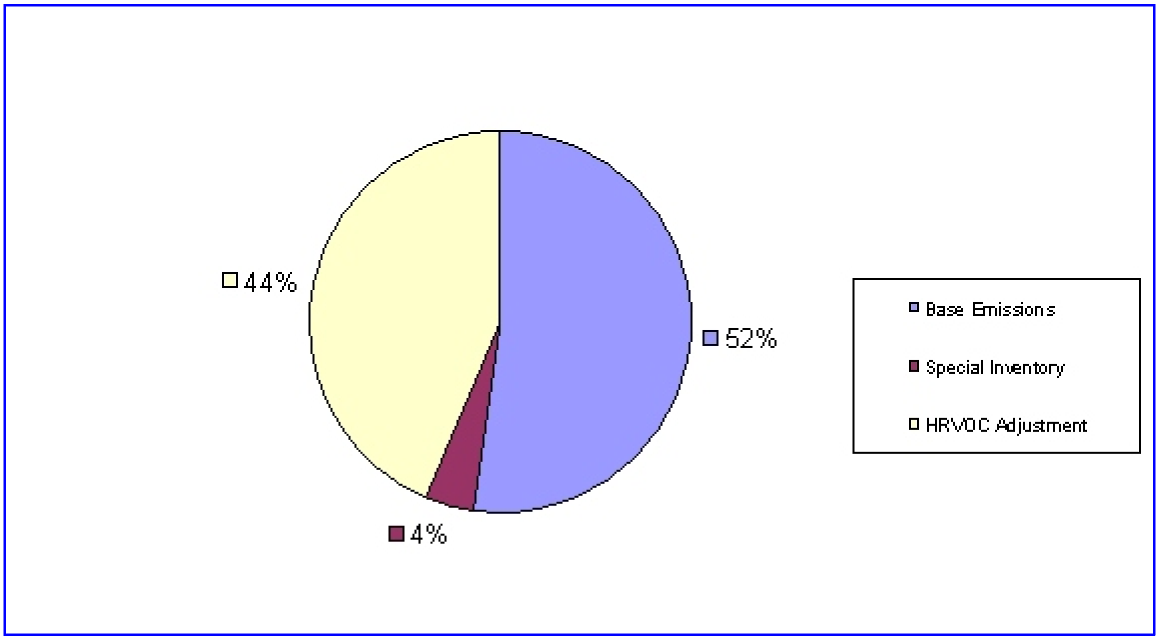


Figure 10. *VOC Point Source Inventory, August 30, 2000*



Region 12 Upset/Maintenance Database

In addition to the TexAQS 2000 Special Inventory data, data submitted to the TCEQ Region 12 Upset/Maintenance Database were reviewed. All emission events reported during the modeling episode time period were examined and cross-referenced with the emission events reported to the Special Inventory. Events not already included in the Special Inventory were extracted from the database and processed as part of the base case modeling inventory. Only events with quantifiable amounts of CO, NO_X or VOC over the episode were considered for inclusion. Some examples of the data included are: a large CO upset of 885 lb/hr, NO_X upsets varying from 4 lb/hr to 295 lb/hr, and VOC upsets varying from 0.07 lb/hr to 295 lb/hr. Table D.3 presents the daily Region 12 Upset/Maintenance Database emissions modeled for the current episode.

Table D.3: *Non-Special Inventory Region 12 Upsets*

Date	CO (tpd)	NO_X (tpd)	VOC (tpd)
18-Aug-00	10.62	0.24	0.31
19-Aug-00	10.62	0.24	0.38
20-Aug-00	10.62	0.21	0.00
21-Aug-00	10.62	0.21	0.00
22-Aug-00	3.54	0.07	0.24
23-Aug-00	0.00	0.00	0.23
24-Aug-00	0.00	0.00	0.53
25-Aug-00	0.00	0.00	0.29
26-Aug-00	0.00	0.00	0.00
27-Aug-00	0.00	0.00	0.00
28-Aug-00	0.00	0.29	3.06
29-Aug-00	0.00	0.00	1.99
30-Aug-00	0.00	0.00	3.01
31-Aug-00	0.00	0.00	0.89
1-Sep-00	0.00	0.00	0.46
2-Sep-00	0.00	0.00	0.88
3-Sep-00	0.00	0.00	0.19
4-Sep-00	0.00	0.00	0.27
5-Sep-00	0.00	0.00	0.45
6-Sep-00	0.00	0.30	0.69

Louisiana Point Sources

The Louisiana Department of Environmental Quality (LDEQ) supplied a copy of its year 2000 point source emissions inventory in AIRS Facility Subsystem (AFS) format. Modeling staff, with assistance and Quality Assurance (QA) from LDEQ point source emissions staff, completed an AFS-to-ARPDB cross-reference list, which links Acid Rain Program boilers to their corresponding LDEQ stack identifiers. With this cross reference list completed, the LDEQ annual EGU emission records were replaced with hourly ARPDB emissions for each modeling episode day.

Regional Point Sources

For the states in the remainder of the modeling domain, beyond Texas and Louisiana, point source emission records in AFS format were obtained from ENVIRON. These 1999 National Emissions Inventory (NEI) v1 data were prepared for near-nonattainment modeling performed by ENVIRON for several areas of Texas. The AFS files were reviewed and Texas and Louisiana records were removed from the data to avoid double-counting.

An AFS-to-ARPDB cross-reference list was developed for boilers larger than 750 megawatts capacity that are subject to EPA’s Acid Rain Program. This cross-reference list links these boilers to their corresponding NEI/AFS stack identifiers. With this cross-reference, the ozone-season daily emission records were replaced with corresponding hourly ARPDB emissions for each hour of the modeled episode.

Offshore Point Sources
The TCEQ has been in contact with the Minerals Management Service (MMS) over the last several years to monitor the status of the 2000 Gulf-Wide Emission Inventory (GWEI). As of this writing, the data have not been made available to the public, so it was not used in the current round of modeling.

In Phase 1 of the MCR, the 2000 offshore EI was generated by growing the 1992 MMS offshore EI, in-place, by a factor to account for the growth in offshore production platforms, based on a previous MMS report. Based on the recommendation of MMS, all point source offshore emissions were grown by 44%, assuming that the ancillary stationary point source equipment would grow at the same rate as the number of offshore platforms. An explanation of the 44% growth factor follows.

According to MMS's contractor, Eastern Research Group (ERG), 3,154 offshore platforms were counted for 2000. According to the 1995 revised final draft report, Gulf of Mexico Air Quality Study (GMAQS) by MMS's contractor, SAI (Systems Applications International, Inc., 1995), the number of platforms counted for 1992 was 1,857 with an 85% response rate. Assuming that 2,185 (1857/0.85) would be the number of platforms in 1992 (and thus providing a more conservative growth estimate), the number of offshore platforms has grown approximately 44% (3154/2185) between 1992 and 2000. Since the 2000 offshore inventory has not yet been officially released by MMS, information on the locations of these new platforms is not available. If this information becomes available, it will be included in future modeling completed during the comment period.

Mexico Point Sources
The Desert Research Institute provided a 1999 Big Bend Regional Aerosol and Visibility Observational (BRAVO) Study Emissions Inventory in Inventory Data Analyzer (IDA) format (Hampden et al., 2001). The inventory was reviewed, the emissions from sources in Mexico were put into a subset, and the data was converted to AFS format for further processing. These emissions were incorporated into current base case modeling.

A preliminary evaluation of the "Mexico National Emissions Inventory, 1999" report (ERG, 2003) has been completed and it has been determined that there were no significant differences in point source emissions between the two inventories. Therefore, the modeling continues to use the 1999 BRAVO inventory.

Plume-in-Grid (PiG) Source Selection
CAMx has an option to model selected point sources with a PiG algorithm. PiG allows a model to simulate plume behavior of elevated point sources within one or more grid cells. That is, the PiG algorithm does not immediately dump a "PiGged" source's emissions into the entire cell at once, but rather keeps the plume cohesive until it is no longer of a sub-grid scale size. With today's computer resources, combined with the efficient PiG algorithm built into CAMx, PiG selection does not have to be as carefully limited as it was historically. Modeling staff selected

PiG sources based on magnitude of NO_x emissions (5 tons/day with a co-location distance of 1 meter). As with Phase 1 of the MCR, over 300 PiG sources across the entire modeling domain, mostly large power plants, were selected.

Point Source VOC Speciation

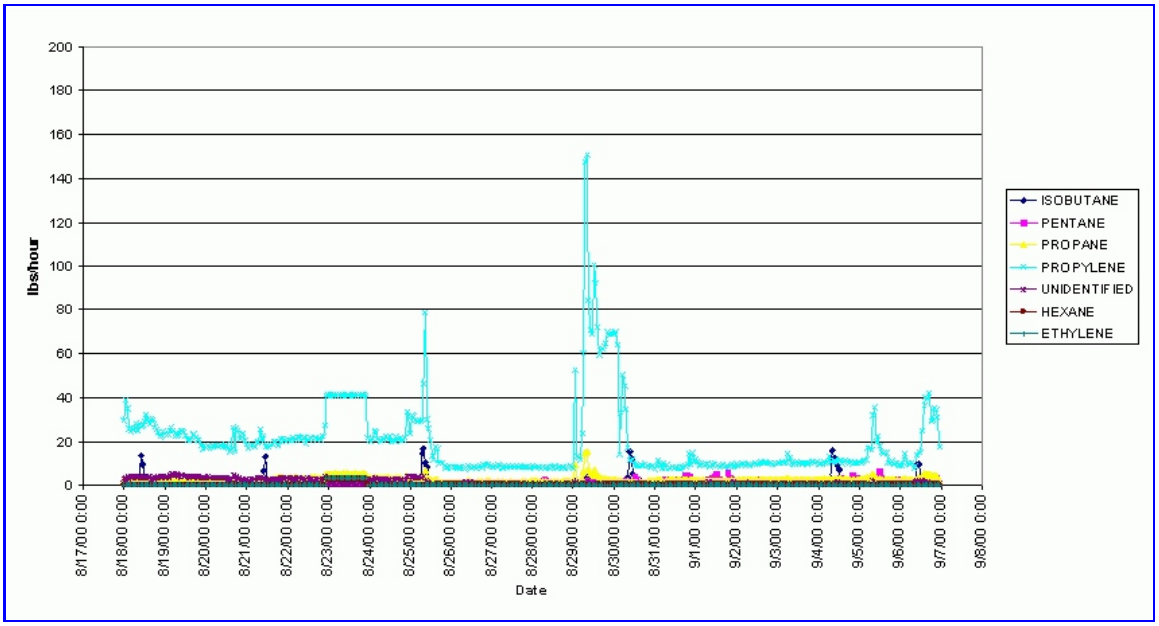
Emissions from both the PSDB and the Special Inventory contain large amounts of information about specific hydrocarbons emitted by each source; however, some sources report little or no speciation of their hydrocarbon emissions.

In Phase 1 MCR modeling, any source which reported less than 75% speciation was assigned either a Texas-specific Source Category Code (SCC)-average or an EPA default speciation profile. For sources reporting 75% or more speciation, the unspeciated emissions were assumed to have the same speciation as the reported emissions. This method is a significant improvement over simply assigning default speciation profiles based on SCCs, but it still has some drawbacks. Specifically, for any source whose emissions are less than 75% speciated, all reported speciation data would be ignored. See "Development of Source Speciation Profiles from the 2000 TCEQ Point Source Database" (Pacific Environmental Services, Inc., 2002), for more details.

For the Phase 2 MCR modeling analysis, a new process was developed which retains virtually all speciated hydrocarbon data reported to the PSDB, regardless of the completeness of the speciation of each point's emissions. Also new for Phase 2 MCR speciation is the exclusion of non-VOC species, as defined by EPA, from all point-source speciation profiles. These procedures are described in "Speciation of Texas Point Source VOC Emissions for Ambient Air Quality Modeling", (Cantu, 2003).

Companies supplied chemical speciation profiles for their hourly emissions as part of the TexAQS 2000 survey. When available, these data were used to develop the CB-IV speciation profiles used in the EPS2x preprocessor to CAMx. In cases where TexAQS-2000 speciation data were incomplete or not available the procedure described in the speciation report above was used. A sample of the speciation data received as part of the Special Inventory is presented in Figure D.11.

Figure 11: *Sample Speciation Data Submitted as Special Inventory Data*



HGB Point Source VOC Emissions Adjustment
One conclusion of the TexAQS 2000 study was that observed concentrations of certain compounds, especially light olefins, were much larger than represented in the reported emissions inventories. This conclusion has been reviewed and documented in numerous scientific journals. In Phase 1 MCR modeling, the reported emissions resulted in a significant under prediction bias in modeled ozone concentrations. However, when a set of HRVOCs was adjusted and used, the model performance markedly improved. This adjustment served to increase the reactivity of the baseline modeling inventory, i.e., it increased the inventory's ozone yield potential.

The adjustment used in Phase 1 modeling was a second point source emissions file containing all emission points for the largest HRVOC-emitting accounts in the 8-county nonattainment area (NAA). This file was used to provide the extra HRVOC emissions necessary to make the selected facilities' HRVOC emissions equal their individual NO_X emissions. This HRVOC-to-NO_X adjustment was first proposed by Greg Yarwood of ENVIRON, based on data collected by an instrumented aircraft operated by Baylor University. On October 19, 2001 the aircraft monitored a number of industrial plumes where high concentrations of light olefins coincided with high NO_y concentrations (NO_y consists of NO_X plus other nitrogen compounds which are typically products of photochemical reactions such as nitric acid). In four of these plumes, the concentration ratio of light olefin to NO_y was observed to be between 0.8 and 1.0, consistent with the assumption of roughly equal emissions of light olefins and NO_X from the plume sources. Note that the terms "light olefins" and HRVOCs are not entirely synonymous, but are nearly so. See the December 2002 SIP Revision Technical Support Document (TCEQ, 2002) for more details.

Since the completion of Phase 1 modeling, several additional studies have been conducted comparing reported inventories to ambient measurements, both airborne and at ground level.

These studies generally agree that emissions of HRVOCs are significantly under-reported. The approach used in Phase 1 modeling is supported by an independent study conducted for the Houston Advanced Research Center by ENVIRON, Project No. H6E.2002, “Top-Down Evaluation of the Houston Emission Inventory using Inverse Modeling” (Yarwood et al., 2003). This study used inverse modeling to assess various inventory components, and concluded that further modification of the inventory used in Phase 1 was not warranted under the then-current model formulation.

For the Phase 2 MCR modeling analysis, the HRVOC adjustment has been improved significantly over the 2002 modeling. The extra HRVOC emissions are now explicitly speciated as individual compounds in this phase of modeling, based on the speciation profiles of individual accounts, whereas in previous modeling, HRVOCs were increased for all accounts using a generic olefin mixture. The specific compounds selected for adjustment are those known as “terminal olefins”, which have a specific chemical structure that is easily detectible by an instrument carried aboard the Baylor research aircraft[1]. The list of the olefins for which adjustments were made (all terminal olefins reported in the PSDB) is provided in Table D-4.

Table D.4: *Terminal Olefins Selected for Imputation*

Species
Ethylene
Propylene
1-Butene
1,3-Butadiene
1,2-Butadiene
Pentene
2-Methyl-1-Butene
3-Methyl-1-Butene
Hexene
Isoprene
1-Decene
Propadiene
E-1,3-Pentadiene

In the Phase 1 MCR modeling, HRVOC adjustments were applied on a source-by-source basis by setting each selected source’s HRVOC emissions equal to that source’s reported NO_X emissions.

[1]Although the measurement instruments onboard the Baylor aircraft were primarily designed for isoprene detection, they also respond well to other “terminal olefins” (an olefin is defined as any unsaturated hydrocarbon containing one or more pairs of carbon atoms linked by a double bond; a terminal olefin is one in which a double bond resides at the end of the carbon chain). A study to determine the instruments’ actual response to other olefin species is planned for the near future. Information has been published regarding these instruments’ olefin detection limits, and can be found in Guenther and Hills, 1998.

This adjustment method produced good model performance and increased reactivity to levels more commensurate with aircraft observations. However, because the magnitude of adjustment was established on reported NO_X emissions, many large HRVOC sources received little or no adjustment, while some relatively small HRVOC sources (e.g. refineries) received very large increases. In the 2002 SIP revision, this situation was addressed in the allocation of caps by first re-distributing the additional reactivity in proportion to the sources' reported HRVOC emissions, which resulted in a more equitable cap allocation.

Subsequent to the Phase 1 MCR modeling, we ran sensitivity analyses to see what effect this re-allocation would have on model performance, and we determined that the model performance was comparable between the two adjustment methodologies. So for Phase 2, instead of adjusting emissions on a source-by-source basis, we first calculated the total NO_X emissions for accounts in the 8-county area whose speciated inventory indicated 10 tons/year or more of terminal olefin emissions. Then we totaled the reported emissions of terminal olefins from these sources and took the molar ratio of (total NO_X)/(total terminal olefins) to define a scaling factor. This scaling yielded the amount of additional mass included in the non-varying adjustment. This mass was then allocated, via a weighted distribution based on the speciated modeling inventory, to all points whose speciation information included any of the terminal olefins in Table D-4.

Two types of adjustments were developed using this method, a non-varying adjustment similar to that used in previous modeling and an adjustment that incorporates Special Inventory daily and hourly emission fluctuations. Overall, these enhancements change the modeled reactivity only slightly from previous modeling, but provide for much more flexibility in control strategy modeling. The improved non-varying HRVOC adjustment adds 155 tons/day of VOC to the HGB 8-county area, as opposed to the 149 tons/day added in previous modeling, and the resulting reactivity is approximately 91% of the reactivity previously added to the model. The varying adjustment fluctuates from 163 to 203 tons/day.

The TCEQ plans to conduct additional studies comparing ambient concentrations of olefins to the inventory, and will work towards developing more targeted adjustments, especially now that several new automatic gas chromatographs (Auto-GCs) have been deployed in the industrial sectors of the HGB area. In addition to in-house analyses, TCEQ plans to use the results of other pertinent studies of ambient VOC measurements that have been or will be conducted by scientists and consultants using data from the HGB area. Specifically, TCEQ plans to use the findings of the following studies for guidance, if appropriate:

1. In-house studies of VOC/NO_X ratio measurements from the TCEQ and EISM auto-GC networks;

2. Advanced multivariate receptor modeling using trajectory analyses and matrix separation techniques, to be performed by Pacific Northwest National Lab researchers and their research colleagues;

3. Positive matrix factorization and other ambient/emissions inventory analyses that have recently been performed by consultants for HARC/TERC (Roberts, P., S. Brown, S. Reid, M. Buhr, T. Funk, P.Steifer, P. Hopke, E. Kim (2004). Emission Inventory Evaluation and

Reconciliation in the Houston-Galveston Area: Final Report. STI-903640-2490-FR, HARC project H6C, prepared for: Houston Advanced Research Center, Texas Environmental Research Consortium, The Woodlands, TX, March 19, 2004);

4. Other studies that seem useful, such as

   (a) Zhao W., P. Hopke, and T. Karl (2004). Source identification of volatile organic compounds in Houston, Texas. ENVIRON. Sci. Technol. 38: 1338-1347; and

   (b) Karl, T., T. Jobson, W. C. Kuster, E. Williams, J. Stutz, R. Shetter, S. R. Hall, P. Goldan, F. Fehsenfeld, and W. Lindinger, (2003). Use of proton-transfer-reaction mass spectrometry to characterize volatile organic compound sources at the La Porte super site during the Texas Air Quality Study 2000, J. Geophys. Res., 108(D16), 4508, doi:10.1029/2002JD003333, 2003.

Point Source Base Case Emissions Summary

Tables D.5, D.6, and D.7 summarize the base case point source emissions for August 30, 2000. Note that "CB-IV HC" represents tons of hydrocarbon emissions after transformation to the Carbon Bond IV chemical mechanism, the simplified chemistry used by many photochemical models including CAMx. CB-IV mass typically differs from VOC mass by up to 20 percent. "Region 12 U/M" is the mass added from the TCEQ Region 12 Upset & Maintenance database (this is in addition to the emissions variability reported in the Special Inventory, which is already included in the EGU and NEGU emissions). Finally, "HGB Olefin Adjustment" is the mass added to the model by adjusting emissions of terminal olefins as described above. Figures D.12 and D.13 are point source NO_X and CB-IV HC emissions tile plots for the HGB modeling subdomain for August 30, 2000.

Table D.5: *HGB Point Source Emissions (Tons/Day) - August 30, 2000*

	NO_X	**VOC**	**CB-IV HC**
EGU	225.91	3.81	3.44
Non-EGU	265.96	208.86	190.66
Region 12 U/M	0.00	2.93	3.26
Unadjusted Totals	**491.87**	**215.60**	**197.37**
HGB Olefin Adjustment	0.00	168.01	192.20
Adjusted Totals	**491.87**	**383.61**	**389.57**

Table D.6: *BPA Point Source Emissions (Tons/Day) - August 30, 2000*

	NOX	**VOC**	**CB-IV HC**
EGU	34.90	0.82	0.72
Non-EGU	84.35	66.87	63.81
Region 12 U/M	0.00	0.00	0.00
Totals	**119.25**	**67.69**	**64.53**

Table D.7: *Domain Wide Point Source Emissions (Tons/Day) - August 30, 2000*

	NO_X	VOC	CB-IV HC
Texas EGU	1348.26	19.63	19.24
Texas Non-EGU	856.74	500.67	458.37
Region 12 U/M	0.00	3.01	3.32
HGB Olefin Adjustment	0.00	168.01	192.20
Louisiana EGU	404.04	3.29	3.31
Louisiana Non-EGU	630.90	218.79	197.25
Other EGU	5565.30	39.28	42.10
Other Non-EGU	1862.21	1769.35	1509.63
Offshore Points	546.08	188.85	56.03
Mexico Points	272.34	0.41	0.31
Totals	**11485.88**	**2911.30**	**2481.76**

Figure 12: *HGB Subdomain Base Case Point Source NO_X Tile Plot*

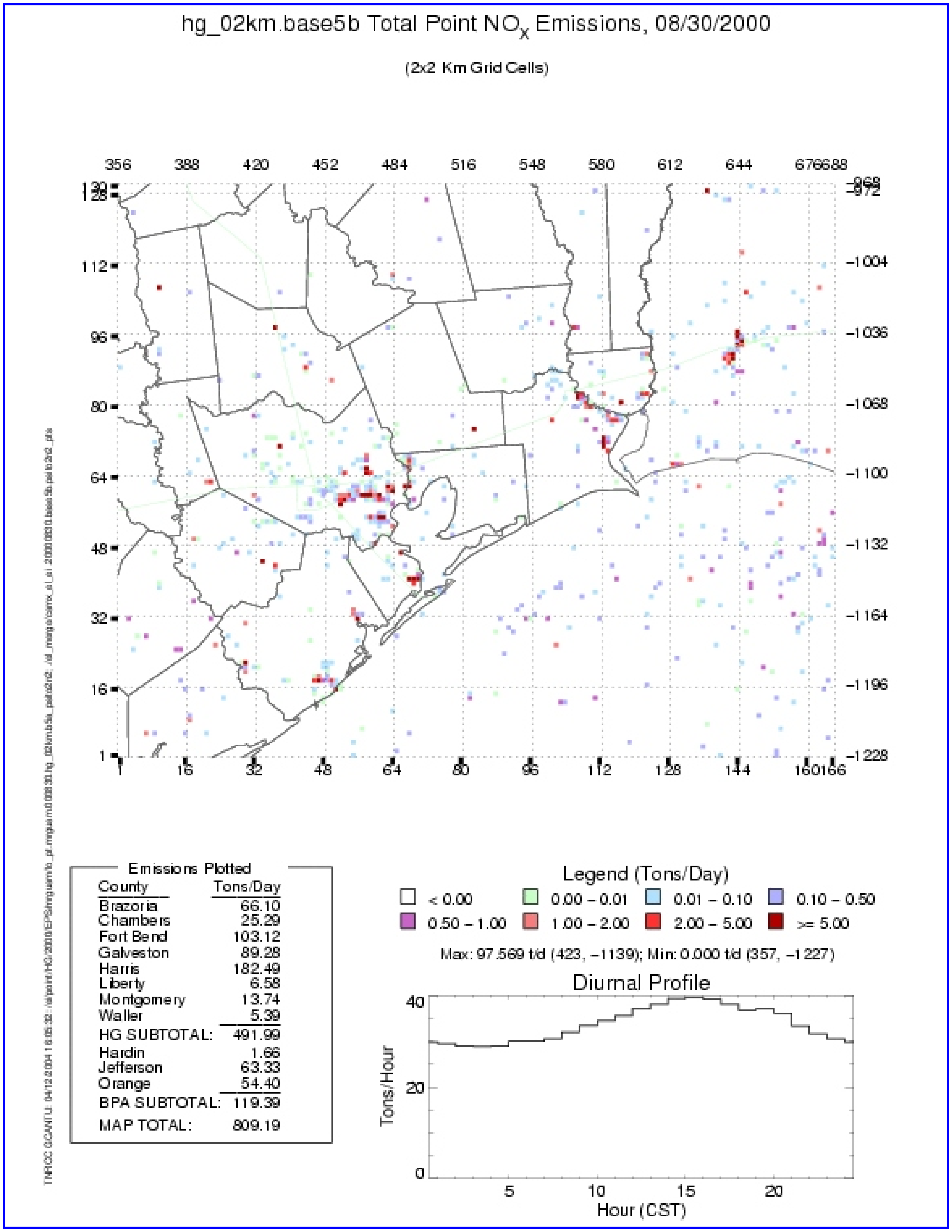
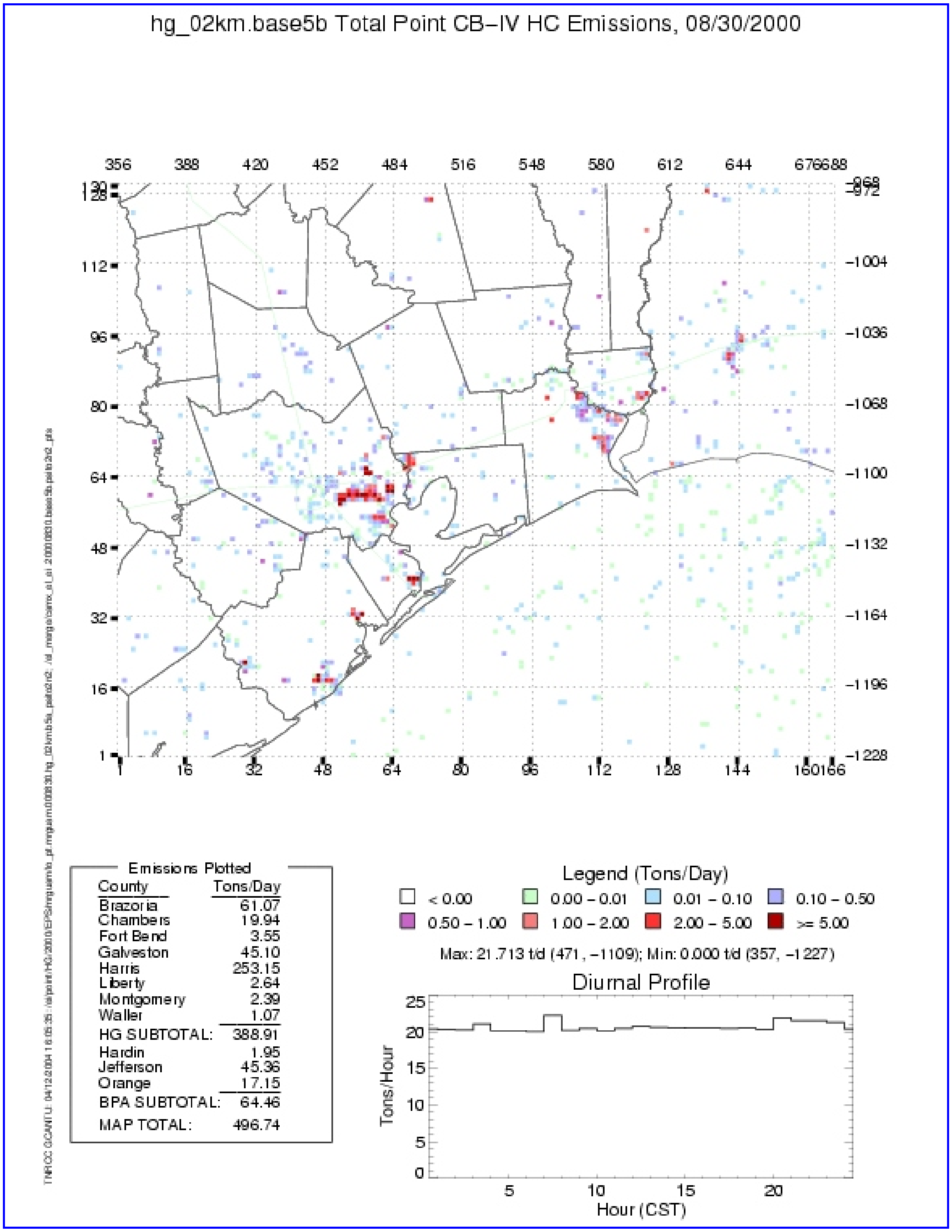


Figure 13: *HGB Subdomain Adjusted Base Case Point Source CB-IV HC Tile Plot*



D.2 2007 Future Year Point Source Modeling Inventory Development – Growth

Table D.8, below, summarizes the methods used to grow the point source inventory, the base case inventory upon which the growth was applied, and the computer filename of the modeling "growth packet."

Table D.8: *2007 Future Base Case Summary of Growth Methods*

Geographic Area	Inventory Used	Growth Applied	File Name
Regional (Outside of Texas)	EGU (1999 NEI v1 w/ hourly 2000 Acid Rain Data)	EGAS 99-07	*RegionalEGASGrowthFactors99to07*
	NEGU (1999 NEI v1)	EGAS 99-07	*RegionalEGASGrowthFactors99to07*
Louisiana	EGU (LDEQ 2000 AFS w/ hourly Acid Rain)	EGAS 00-07	*LouisianaEGASGrowthFactors00to07*
	NEGU (LDEQ 2000 AFS)	EGAS 00-07	*LouisianaEGASGrowthFactors00to07*
Offshore	GMAQS points	assumed same as 2000 (grown 44% from 1992 GMAQS)	N/A
Mexico	1999 Mexico "NEI"	none	N/A
HGB	EGU	newly-permitted EGUs (additional AFS file)	N/A (already included in the HGB Cap)
	NEGU	Banked (ERCs and DERCs) NO_X and VOC	*grow.NAA_Banks_NEGU* and *TIPIEGASGrowthFactors00to07v3* (just grows CO, since bank takes care of NO_X and VOC)
	HRVOC Cap	none	N/A
BPA	EGU	newly-permitted EGUs (additional AFS file)	*afs.hgmcr2004.new_egu_TX-HG.lcp_v3* then apply 75% demand-to-capacity to the new EGUs via *control.075N.new_egu*
	NEGU	Banked (ERCs and DERCs) NO_X and VOC	*grow.NAA_Banks_NEGU* and *TIPIEGASGrowthFactors00to07v3* (just grows CO, since bank takes care of NO_X and VOC)

Geographic Area	**Inventory Used**	**Growth Applied**	**File Name**
DFW	EGU	newly-permitted EGUs (additional AFS file)	*afs.hgmcr2004.new_egu_TX-HG.lcp_v3* then apply 75% demand-to-capacity to the new EGUs via *control.075N.new_egu*
	NEGU	Banked (ERCs and DERCs) NO_X and VOC	*grow.NAA_Banks_NEGU* and *TIPIEGASGrowthFactors00to07v3* (just grows COemissions, since bank takes care of NO_X and VOC)
East Tx	EGU	newly-permitted EGUs (additional AFS file)	*afs.hgmcr2004.new_egu_TX-HG.lcp_v3* then apply 75% demand-to-capacity to the new EGUs via control.075N.new_egu
	Cement Kiln NO_X	newly-permitted units/ modifications and TIPI 00-07 to existing kilns	*afs.MidloKilns._v5* then apply *ellis_kilns.TIPI.00-07*
	Agreed Orders and Consent Decree for East Texas	N/A	N/A (agreed reductions, not growth)
	all others	TIPI-EGAS 00-07	*TIPIEGASGrowthFactors00to07v3*
West Tx	EGU	newly-permitted EGUs (additional AFS file)	*afs.hgmcr2004.new_egu_TX-HG.lcp_v3* then apply 75% demand-to-capacity to the new EGUs via *control.075N.new_egu*
	NEGU	TIPI-EGAS 00-07	*TIPIEGASGrowthFactors00to07v3*

Regional Point Source Growth

Initially, Modeling staff obtained EPA's 2007 Heavy Duty Diesel (HDD) regional point source inventory in AFS format from the ENVIRON Corporation. This inventory was prepared by EPA to assess the impacts of federal HDD regulations and was used for full-scale regional modeling. Since the HDD control assumptions made by EPA impacted on-highway vehicle and nonroad emission source sectors, the point source inventory remained unaffected by the HDD regulations. The inventory did however include regional point source growth assumptions and NO_X SIP Call Controls. Thorough evaluation of these files and inventory development methods revealed multiple issues. Through the process of attempting to resolve these issues staff discovered that the original HDD database files were no longer available (no longer supported) from EPA's website. Therefore, modeling staff chose not to pursue the HDD as a future case inventory.

Instead, the existing 1999 NEI v1 EGU and NEGU files, that had been supplemented with hourly 2000 Acid Rain data, were grown using EGAS 4.0 on a 2-digit SIC basis. (See the EGAS 4.0 Reference Manual, available on EPA's CHIEF website). Table D.9 is a summary of the "grown" Regional inventory.

Table D.9: *Regional 2007 Modeled Growth for August 30*

Regional source	**1999/2000 NO_X (tpd)**	**1999/2000 VOC (tpd)**	**2007 NO_X (tpd)**	**2007 VOC (tpd)**	**% NO_X Growth**	**% VOC Growth**
EGU	5565.3	39.3	5710.7	42.3	3%	8%
NEGU	1862.2	1769.3	1945.6	2172.9	4%	23%
Total	7427.5	1808.6	7656.3	2215.2	3%	22%

Louisiana Point Source Growth

The 2000 Louisiana point source inventory was grown to 2007 with EGAS 4.0 projection factors. This NO_X and VOC growth in Louisiana is represented in Table D.10.

Table D.10: *Louisiana 2007 Modeled Growth for August 30*

Louisiana source	**2000 NO_X (tpd)**	**2000 VOC (tpd)**	**2007 NO_X (tpd)**	**2007 VOC (tpd)**	**% NO_X Growth**	**% VOC Growth**
EGU	404.1	3.3	449.6	3.6	11%	9%
NEGU	631.0	218.8	647.4	234.0	3%	7%
Total	1035.1	222.1	1097.0	237.6	6%	7%

Offshore Point Source Growth

As noted in the Base Case Point Source Emissions Inventory Development section, the 2000 GWEI, which may provide guidance for growth of the Offshore points beyond 2000, is unavailable. While it was indicated by MMS that an assumption of 44% growth of point source emissions from 2000 to 2007 might be appropriate, it was also indicated that it would not be appropriate to model that growth in-place, since the platforms built after 2000 have typically been erected beyond the 50-100 mile point from the coastline. As a result, of these unknowns, offshore emissions from the base case were not grown. It is expected that the GWEI will be incorporated in future modeling when it is made available.

Mexico Point Source Growth
Due to a lack of data and the trend toward slowing economic growth in northern Mexico, no growth was applied to point sources in Mexico; hence, the emissions are the same as those used in the base case.

Texas Nonattainment Area Point Source Growth
Growth in NO_X and VOC emissions in the Texas NAAs, HGB, BPA, and DFW, was partially accounted for through the emissions banked in the Emissions Banking and Trading (EBT) database. ERC and DERC totals for each of the NAAs, as of October 9, 2003 were used. These banked emissions could return to the airshed as actual emissions in the future; this growth was applied to the NEGUs, in the respective NAAs. A summary of the emissions is presented here as Table D.11.

Table D.11: *Banked Emissions as of October 9, 2003*

NAA	**NO_X (tpd)**	**VOC (tpd)**
HGB	1.2	13.2
BPA	13.9	1.4
DFW	11.4	0.7

Chapter 101 requires that an ERC must be surplus to any federal, state or local rule. The credits that are in the bank have been devalued to show surplus using the Chapter 117 ESADs. Also, the Chapter 101 MECT DERC use restrictions were incorporated in the NO_X total in Table D.11. Therefore, the bank in HGB has shown a substantial decrease from previous estimates. The totals in Table D.11 for DFW and BPA incorporate offset ratios and Chapter 101 10% environmental contributions.

In addition, growth in the NAAs was accounted for by the inclusion of newly-permitted EGUs. It is expected that existing EGUs in the state will not grow. Rather, much of the existing EGU capacity in the state is being replaced by new, cleaner, more efficient combined-cycle (typically) EGUs, reflected in Table D.12. With a few exceptions, this growth has not been occurring in the nonattainment counties, because of strict nonattainment New Source Review (NSR) requirements. These proposed new EGUs in the NAAs can not obtain a permit without first obtaining offsets, preventing an increase in total nonattainment area emissions. These offsets are normally purchased from the “bank” for the specific NAA. Modeled future actual emissions from these new EGUs are in excess of the banked emissions for each NAA, since they were all permitted prior to the "bank date" of October 2003. Hence, their emissions were not included in the bank values tabulated for October 2003.

Permit applications for these new EGUs throughout the state permitted prior to November 5, 2003 were examined. These permits were then cross-referenced against sources in the 2000 base case EI, to ensure no double-counting occured. These new sources were assembled into a single "new EGU" AFS file of permit allowable emission rates and permitted stack parameters.

It is likely an overestimate of projected demand (and hence, emissions) to assume that these newly-permitted EGUs in the state will all be operating at their permitted levels. Given that permits typically represent full load (capacity) conditions of the equipment, modeling staff adjusted the modeled new EGU emissions downward to more accurately represent future demand on these new EGUs. An analysis of trend data from an October 1, 2003 Electric Reliability Council of Texas (ERCOT) report, "Report on Existing and Potential Electric System Constraints and Needs Within the ERCOT Region", that included future projections, indicates that demand has typically been, and is expected to be (at current growth rates) in 2007, 75% of capacity. Given that power plants typically permit for capacity and operate depending on load and demand, we can say that actual emissions follow demand. Hence, the new EGUs were ultimately modeled at 75% of their permit allowable NOx emission rates. Table D.12 is a summary of these newly-permitted EGUs in the NAAs.

Table D.12: *Newly-Permitted EGUs in NAAs as of November 5, 2003*

NAA	NO_X (tpd)	VOC (tpd)	CO (tpd)
HGB	0	0	0
BPA	5.9	1.7	22.2
DFW	0.3	0.1	0.7

Table D.12 demonstrates that there is no new EGU growth in the HGB NAA. Chapter 101 MECT rules required companies to have an administratively complete permit application prior to January 2, 2001. These accounts obtained allowances based on permit allowables as a result of the MECT Level of Activity certification. Accounts which obtain permit authorization after January 2, 2001 are required to obtain allowances from an account that was allocated allowances or from a broker. Therefore, any NO_X increases at existing or new sources, which are subject to Chapter 117 ESADs in HGB, are already accounted for in the MECT cap; no NO_X growth can occur in HGB for those source types (pieces of equipment) for which Chapter 117 ESADs exist.

CO from NEGU combustion sources is also expected to grow as burner modifications are implemented, because of the inherent off-stoichiometric ratio of air-to-fuel required to achieve low-NO_X combustion. Therefore, NEGU CO was grown from 2000 to 2007 via factors derived from the Texas Industrial Production Index (TIPI), discussed below. Where TIPI SIC factors were unavailable, EGAS 4.0. growth factors were used. Figures D.14 and D.15 are tile plots representing the newly permitted EGU NO_X and CB-IV HC contributions to the modeling domain.

Figure 14: *Newly Permitted Texas EGUs NO_X Tile Plot*

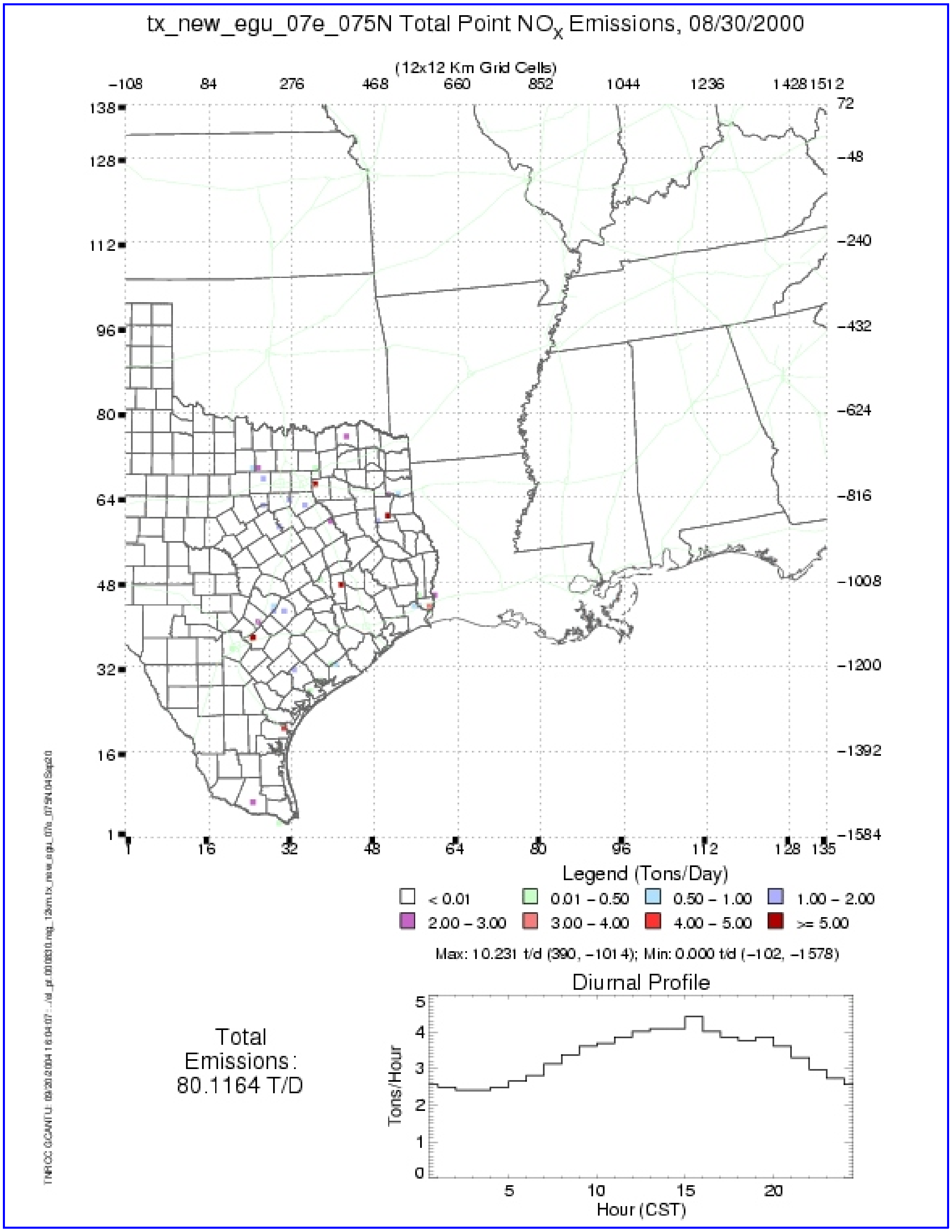
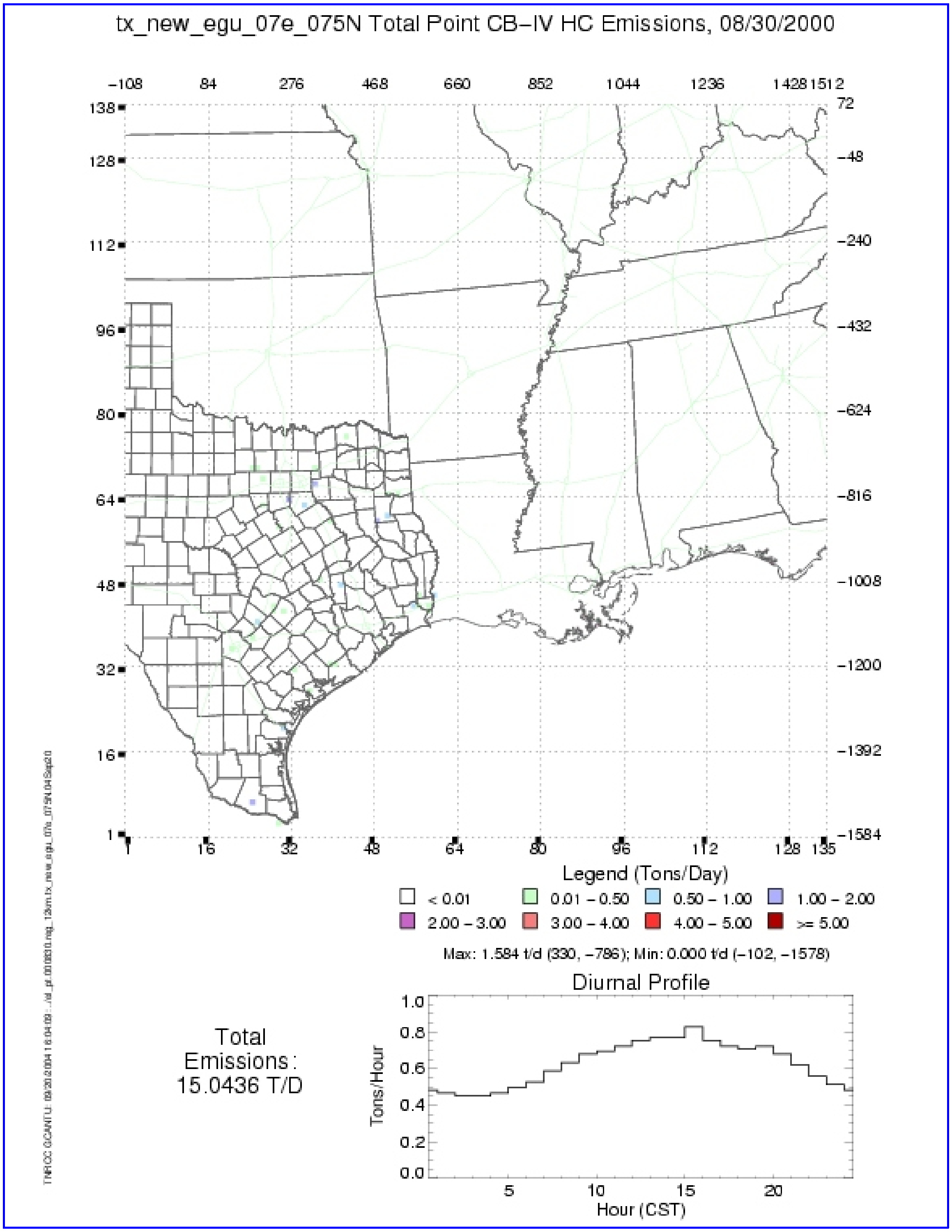


Figure 15: *Newly Permitted Texas EGUs CB-IV HC Tile Plot*



East Texas Point Source Growth
As with the NAAs, newly-permitted EGUs in East Texas were added to the inventory as growth at 75% of their permitted emissions, due to the demand vs. capacity trend discussed above. A summary of the emissions is provided in Table D.13.

Table D.13: *Newly-Permitted EGUs in East Texas as of November 5, 2003*

Sources	NO_X (tpd)	VOC (tpd)	CO (tpd)
EGU	70.7	13.6	149.8

As in the base case, the future 2007 case Ellis County cement kilns were modeled at their 2000 actual emissions, except that seven years of TIPI growth were applied to all existing 2000 kilns. A separate file of the 2000 emissions for Ellis County cement kilns was created. This file also included one new TXI kiln (EPN E2-22) that became operational since 2000; it was included at its permit allowable emission rates. A permit condition of that permit stated that this new kiln cannot operate simultaneously with two of the older kilns, so we created the file, *afs.MidloKilns._v5*, that zeros-out two of TXI's kilns (historically least utilized) while adding the new kiln. TIPI growth for the cement industry was also applied via the file *ellis_kilns.TIPI.00-07*.

All other sources in East Texas were grown using the TIPI-derived factors where available and supplemented with EGAS 4.0 factors where necessary. TIPI was used where possible, because its data are more recent than those in the EGAS 4.0 model. The EGAS model was last updated on January 26, 2001, and uses data and data models which date from the early 1980s to 1999. The REMI model, which is the economic basis of EGAS 4.0 uses economic data which date from 1969 to 1996. Also, EGAS uses historical emissions data from the NEI ranging from 1972 to 1992. (See the EGAS 4.0 Reference Manual, available on EPA's CHIEF website). TIPI uses more recent economic data (November 2003). TIPI-EGAS is the combination of these two databases, as described below.

TIPI data from January 1967 through November 2003 was used in a linear regression analysis to project emissions from 2000 to 2007. TIPI data was available for those industries with 2-digit SIC codes listed in Table D.14.

Table D.14: *Categories Available from the Texas Industrial Production Index*

SIC	Category
10	Mining
13	Oil and Gas Extraction
14	Mining, except Oil and Gas
20	Manufacturing
22	Durables
24	Lumbar and wood products
25	Furniture and Fixtures

32	Stone, Clay, Glass, Concrete
33	Primary Metal Industries
34	Fabricate Metal Products
35	Industrial Machinery and Equipment
36	Electrical and Electronic Equipment
37	Transportation Equipment
38	Instruments
51	Nondurables
54	Food
23	Apparel and other Textile
26	Paper
27	Printing and Publishing
28	Chemicals
29	Refining
30	Rubber and Plastics
49	Utilities
491	Utilities-Electricity
492	Utilities-Gas
99	Total

According to the Federal Reserve Bank of Dallas, TIPI is a value-added index (based on a weighted average of employment, man hours, and some production data). The underlying process to derive TIPI data is the same as the Bureau of Economic Analysis gross-state product. A better surrogate would have been local survey data based on production. However, no such data currently exist for the state of Texas, and resources are not available to conduct such a survey. For further information on the TIPI see http://www.dallasfed.org/data/data/mi5000.tab.htm. For those categories in the Texas EI not covered by TIPI, EGAS factors were used. Table D.15 shows the categories for which EGAS was used.

Table D.15: *Categories Using EGAS Factors*

SIC	Category
17	Special trade contractors
31	Leather and leather products
39	Miscellaneous manufacturing industries
42	Motor freight transportation and warehousing
44	Water transportation
45	Transportation by air
46	Pipelines, except natural gas
47	Transportation services
50	Wholesale trade--durable goods
55	Automotive dealers and gasoline service stations
59	Miscellaneous retail
72	Personal services

73	Business services
75	Automotive repair, services, and parking
76	Miscellaneous repair services
80	Health services
82	Educational services
87	Engineering and management services
96	Administration of economic programs
97	National security and international affairs

For those categories in Texas, not covered by TIPI, EGAS factors were used. Table D.16 presents the growth projections for East Texas based on TIPI-EGAS factors.

Table D.16: *East Texas 2007 TIPI-EGAS Growth for August 30*

Source	2000 NO_X (tpd)	2000 VOC (tpd)	2007 NO_X (tpd)	2007 VOC (tpd)	% NO_X Growth	% VOC Growth
NEGU	382.6	160.1	408.2	178.5	7%	11%

As stated above, new permits have been used to account for changes in emissions where such data are readily available and where resources were available to extract the data from permits (EGUs and cement kilns).

West Texas Point Source Growth

As with the rest of the Texas inventory, newly-permitted EGUs in West Texas were added to the inventory as growth at 75% of their permit allowable emissions. A summary of the emissions from the newly-permitted EGUs is provided in Table D.17.

Table D.17: *Newly-Permitted EGUs in West Texas as of November 5, 2003*

Sources	NO_X (tpd)	VOC (tpd)	CO (tpd)
EGU	6.2	2.5	17.8

Some of these emissions are actually outside of the modeling domain; therefore, other modeling summaries may be inconsistent with these totals. All other sources in West Texas were grown using the same TIPI-EGAS procedure used for the rest of the state. Table D.18 represents the growth projections for West Texas based on TIPI-EGAS factors.

Table D.18: *West Texas 2007 TIPI-EGAS Growth for August 30*

Source	2000 NO_X (tpd)	2000 VOC (tpd)	2007 NO_X (tpd)	2007 VOC (tpd)	% NO_X Growth	% VOC Growth
NEGU	116.6	41.1	117.8	43.3	1%	5%

D.3 2007 Future Year Point Source Modeling Inventory Development – Controls

In addition to the application of growth projections, as described above, Table D.19 summarizes the controls applied to arrive at the future base case point source inventory. The future base case includes all of the controls for which rules have already been written, and have ultimate compliance dates prior to the 1-hour ozone attainment date, November 2007. The subsections that follow describe the controls applied to the various parts of the point source inventory to arrive at the future base case point source emission inventory for the HGB August-September 2000 modeling episode.

The Special Inventory that was modeled in the 2000 base case was considered to be specific to the summer of 2000; hence, it was not carried into the future base cases. The hourly ARPDB-enhanced EGU emissions were projected and controlled in the future, because they represent the typical temporal pattern of baseline, intermediate, or peaking power plants.

Table D.19: *2007 Future Base Case Summary of Controls Applied*

Geographic Area	Base Inventory	Controls Applied	File Name
Regional (Outside of Texas)	EGU (1999 NEI v1 w/ hourly 2000 Acid Rain Data)	NO_X SIP Call (Feb. 2002 Federal Register)	*control.NO_XSIPCall_EGU*
	NEGU (1999 NEI v1)	none	none
Louisiana	EGU (LDEQ 2000 AFS w/ hourly Acid Rain)	Baton Rouge 9-parish NO_X reductions from LDEQ 12/01 SIP (controlled to tpd level in SIP and then grown)	*control.la.9parish.EGU_NEGU*
	NEGU (LDEQ 2000 AFS)	Baton Rouge 9-parish NO_X reductions from LDEQ 12/01 SIP (controlled to tpd level in SIP and then grown)	*control.la.9parish.EGU_NEGU*
Offshore	grown GMAQS	none	none
Mexico	1999 Mexico "NEI"	none	none
HGB	EGU	2007 NO_X Cap	*control.HG_NO_XCap_EGU*
	NEGU	2007 NO_X Cap	*control.HG_07NO_XCap_NEGU*
	HRVOC Cap	Revised Speciation and Cap Cutoff Levels	*control.new_hga_hrvoc_cap.to2n2_negu* and then apply *control.new_hga_hrvoc_cap.less20inharris*
BPA	EGU	Ch. 117 controls; assuming no VOC controls	*control.07TX-HG_egu* (already applied the 75% demand-to-capacity to the new EGUs)
	NEGU	Ch. 117 controls via Emission Factor Survey; assuming no VOC controls	*control.2007.BPA.NEGU*

Geographic Area	Base Inventory	Controls Applied	File Name
DFW	EGU	Ch. 117 controls; assuming no VOC controls	*control.07TX-HG_egu* (already applied the 75% demand-to-capacity to the new EGUs)
	NEGU	Ch. 117 controls via Emission Factor Survey; assuming no VOC controls	*control.2007.dfw.negu*
East Tx	Existing EGUs	SB7 or Ch. 117 controls; assuming no VOC controls	*control.07TX-HG_egu*
	Newly-Permitted EGUs	none (added as growth)	*control.midlothian.energy* (already applied the new EGU file and the 75% demand-to-capacity of the new EGUs via *control.075N.new_egu*)
	Cement Kiln NO_X	permit modifications	already applied permit modifications to *afs.MidloKilns._v5* via *ellis_kilns.TIPI.00-07*
	Agreed Orders and Consent Decree for East Texas	specific reductions at ALCOA and Eastman	*AgreedOrdersControlFactors00to07*
	all others	none	none
West Tx	Existing EGUs	SB7 or Ch. 117 controls; assuming no VOC controls	*control.07TX-HG_egu*
	Newly-Permitted EGUs	none	none
	NEGU	none	none

Regional Point Source Controls
The only Regional point source control strategy modeled was the federal NO_X SIP Call. The latest reductions, as obtained from the Federal Register, dated February 2, 2002, were assumed indicating EGU NO_X reductions of:

- 27% in Illinois
- 32% in Indiana and Kentucky
- 33% in Ohio
- 23% in Tennessee
- 29% in northern counties of Alabama
- 28% in Northern counties of Georgia
- 34% in Eastern counties of Missouri

While the HDD point source inventory inherently accounted for NO_X SIP Call controls, the inventory was prepared well before the February 2, 2002 Federal Register. The NO_X controls extracted from the referenced 2002 Federal Register are more recent than those used in the HDD inventory preparation. The HDD point source inventory contained no other regional point source control strategies, as the EPA 2007 Control Case inventories were developed by applying HDD control assumptions to the on-highway vehicle and nonroad emission source sectors; therefore, only NO_X SIP Call controls were applied to the Regional point source inventory.

These controls were applied to the 1999 NEI v1 EGU file that had been supplemented with hourly 2000 Acid Rain data and grown as described above. No controls were modeled for NEGUs outside of Texas and Louisiana, and no VOC reductions were modeled. Table D.20 represents the 2007 controlled emissions summary for the Regional Point Sources.

Table D.20: *Modeled Regional NO_X Emissions Summary for August 30*

Source	1999 NO_X w/2000 Acid Rain (tpd)	2007 NO_X w/EGAS Growth (tpd)	2007 NO_X w/Growth and NO_X SIP Call Controls (tpd)
EGU	5565.3	5711.8	4666.8
NEGU	1862.2	1946.0	2074.4
Total	7427.5	7657.8	6741.2

Louisiana Point Source Controls
Based on guidance from LDEQ management, the NO_X SIP control strategy information from LDEQ's December 2001 Baton Rouge attainment demonstration was applied. Specifically, reductions of 34% in EGU and non-EGU NO_X in the Baton Rouge 9-parish area were applied to the LDEQ-supplied 2000 point source inventory. No VOC reductions were modeled. Table D.21 represents the modeled emissions summary for Louisiana Point Sources.

Table D.21: *Louisiana Modeled NO_X Emissions Summary for August 30*

Source	2000 NO_X w/Acid Rain (tpd)	2007 NO_X w/EGAS Growth (tpd)	2007 NO_X w/Growth and LDEQ SIP Controls (tpd)
EGU	404.0	449.6	403.5
NEGU	630.9	647.4	586.2
Total	1034.9	1097.0	989.7

Offshore Point Source Controls
As discussed in the Offshore Point Source Growth section of this document, the offshore inventory was not grown from the 2000 base case, nor have controls been applied to existing offshore point sources because the information is unavailable.

Mexico Point Source Controls
As with the offshore inventory, it is conservatively being assumed that no controls will be applied to Mexican point sources between 1999 and 2007. Therefore, no controls were applied to Mexican point sources for 2007 modeling.

Texas Nonattainment Area (HGB, BPA, DFW) Point Source Controls

<u>HGB</u>
In HGB, the Chapter 101 Mass Emissions Cap and Trade (MECT) program was applied. It incorporates all of the ESADs from Chapter 117 and provides annual NO_X allowances that accounts can emit in each year subsequent to 2002. A summary of the emissions that would be allowed in 2007 was generated and summed:

1. MECT allowances (see Table D.22),
2. Part of the banked NO_X emissions that can be used in MECT (2.1 tpd EGU and 2.1 tpd NEGU),
3. Estimate of the total tpd from sources that are exempt from ESADs (too small or not a controlled category) (17.1 tpd NEGU), and
4. Estimate of the sources which are subject to ESADs but were not included in MECT (and take 80% off of those, since ESADs apply) (4.1 tpd NEGU).

This sum became an estimate of the NO_X emissions in 2007 for the HGB 8-county area. Trading is allowed within the NAA, since this area is under the MECT program. Reductions were spread across the entire nonattainment area, the geographical area where the future emissions could occur or reoccur. Thus, a simple ratio of future allowance to base case emissions was calculated to give the reductions in Table D.22. The numbers in Table D.22 represent the NO_X cap values for a generic ozone day, as opposed to a specific modeled episode day.

Table D.22: *HGB 8-County Ozone Season Daily (OSD) NO_X Cap Summary*

HGB sources	2000 NO_X OSD (tpd)	2000 NO_X w/Acid Rain (tpd)[1]	2007 MECT NO_X Cap (tpd)	2008 MECT NO_X Cap (tpd)	2007 Modeled NO_X (tpd)[2]
EGU	192	203	23	23	25
NEGU	283	283	113	104	135
Total	475	486	136	127	160

[1] average day of the hourly Acid Rain data over 20-day episode

[2] includes all 4 of the summed estimates above; excludes non-MECT bank, newly-permitted EGUs, and Special Inventory

NOTE: gridded vs. non-gridded emissions summaries may vary slightly

This table shows that the EGUs in HGB maintain the same level of NO_X emissions from 2007 to 2008, yet the NEGUs receive another 3% reduction from 2007 to 2008. This reduction is due to the phased-in approach of the MECT program for HGB. The compliance date for the ESADs in Chapter 117 for EGUs is 2005, so all of the reductions for EGUs should be completed by 2005. The last phase of MECT for HGB NEGUs occurs in April 2008; so the capped NO_X sources will remain unchanged after April 2008.

The NO_X values for the year 2000, in Table D.23, represent the emissions modeled for August 30, 2000. These emissions include the Special Inventory and Acid Rain variations. The emissions shown for 2007 do not include the SI emissions, for the reasons discussed above, but do include the growth (non-MECT banked emissions and the newly-permitted EGUs).

Table D.23: *HGB 8-County Modeled NO_X Emissions Summary for August 30*

HGB sources	2000 NO_X w/SI and Acid Rain (tpd)	2007 Modeled NO_X w/Cap Controls (tpd)	2007 Modeled NO_X w/Cap Controls and Growth (tpd)
EGU	225.9	27.1	27.1
NEGU	266.0	130.4	135.5
Total	491.9	157.5	162.6

NOTE: gridded vs. non-gridded emissions summaries may vary slightly

Modeling the HRVOC Rules in HGB

Table D.24 summarizes the VOC species targeted for regulation TCEQ Chapter 115 rules. These species are a subset of the terminal olefins that were adjusted as described in the base case modeling inventory section previously presented.

Table D.24: *HRVOCs Regulated by Chapter 115 Rules by Area*

HGB source	Species
Harris County	Ethylene Propylene 1,3-Butadiene All Butenes
Seven Surrounding Counties	Ethylene Propylene

The HGB HRVOC cap specifically targets flares, cooling towers, and vents, while fugitive emissions are regulated separately. It is not possible for modeling staff to explicitly model controls for specific source types, because there is limited information contained in STARS (and its predecessor database, PSDB) on specific emission point classifications, e.g., flares, fugitives, cooling towers, and vents. An early attempt at emission point classification, one prior to December 2002, led staff to consider that a certain percentage of emissions in each portion of HGB should be subject to site-wide caps. This classification scheme is reflected in the current HGB HRVOC cap and was the best available at the time. More refined attempts at emission point classification have been made since then, and the Commission has expanded the emission point classifications beginning with the 2003 Emission Inventory Questionnaires.

In the interim, staff modeled the HRVOC totals for each area (Harris County and the Seven Surrounding Counties), as summarized by the cap rules and other fugitive reductions. Due to fundamental changes in modeling inventory speciation and inventory adjustment methodology, both described previously in this document, along with limited information on emission point types, it is not possible for staff to explicitly model the site-specific caps as published in Tables 6-2.1 and 6-2.2 of the *Post-1999 Rate-of-Progress and Attainment Demonstration Follow-up SIP for the Houston/Galveston Ozone Nonattainment Area* adopted on December 13, 2002. Therefore, modeling staff developed a method similar to that used in the published December. 2002 tables to approximate reductions for the areas using the current modeling inventory and terminal olefin adjustment.

Under this method, the adjusted modeling inventory was screened for account-level HRVOC totals greater than 10 tons/year. These totals were then split into what is assumed to be capped sources and non-capped sources (fugitives) according to the percentages published in the aforementioned Tables 6-2.1 and 6-2.2 (80.7% for Harris and 88.7% for the seven surrounding counties). "Control Levels" were then assigned to each account's capped source totals according to the method used in Tables 6-2.1 and 6-2.2, i.e. 70% control for accounts with totals greater than 500 lb/hr HRVOC, 68% control for accounts with totals between 125 and 500 lb/hr HRVOC, 60% control for accounts with totals between 10 and 125 lb/hr HRVOC, and 50% control for accounts with totals less than 10 lb/hr HRVOC. A 64% reduction was applied uniformly to all remaining non-capped sources. Additionally for Control Strategy 06 (CS-06), 20 tpd of HRVOC was removed uniformly from adjusted Harris County totals.

This method of modeling area-wide totals is similar in theory to that used to model the Chapter 101 MECT program, in which, reductions were spread over the entire geographical area since it is unknown where emissions may occur/reoccur under a system in which trading is allowed.. Also, as of this writing, 24-hour rolling average site-wide HRVOC allocations do not exist under the currently proposed HRVOC Cap and Trade system. Table D.25 summarizes the total (unadjusted plus extra) ozone season daily HRVOCs for 2000 and 2007.

Table D.25: *HGB 8-County Modeled HRVOC Summary*

HGB Source	2000 Unadjusted Modeling Inventory Ozone Season Daily HRVOC (tpd)[1]	2000 Total Adjusted Modeling Inventory Ozone Season Daily HRVOC (tpd)[2]	2007 Total Adjusted Modeling Inventory Ozone Season Daily HRVOC (tpd)[2]
Harris County	20.6	115.0	22.6
Seven Surrounding Counties	10.0	56.3	22.0

[1] Ozone season daily totals do not include Special Inventory or Region 12 Upset/Maintenance data. These totals are adjusted upward slightly due to Commission application of rule effectiveness estimates.
[2] The total is the sum of the unadjusted (as reported) and the extra (imputed) terminal olefins.

BPA

In the BPA 3-county area, Chapter 117 NO_X rules affect EGUs and NEGUs, with separate and distinct control packets applied to simulate these rules. No VOC controls were applied to BPA. The emission factor (EF), e.g., lb/MMBtu, for a piece of equipment is dictated by Chapter 117. In order to determine the reduction to apply to the unit from 2000, EFs from the 2000 point source inventory were needed. This information is only sometimes supplied by a company representative when completing their annual EIQ. For EGUs that are Acid Rain units, the EF can be found in the ARPDB as the "NO_X Rate". The third quarter 2000 (2000Q3) ARPDB was used as the basis for the EGU EFs. The simple formula

$$EF_{2007} / EF_{2000} = CF$$

provides the control factor (CF) that can be found in the control packet that was applied. See Table D.19 for the file name. The 2007 emission rate is calculated by multiplying the 2000 emission rate (or the grown 2000 emissions) by the CF. The reduction factor (RF) from 2000 to 2007 is then

$$1 - (EF_{2007} / EF_{2000}) = RF$$

For BPA NEGUs, a similar process was used, yet there is no ARPDB for NEGUs. Instead, a survey was conducted of all of the BPA NEGU units reporting more than 25 tpy of NO_X in their 2000 EIQ. These units represented 92% of the total BPA NEGU NO_X. This survey included email requests to company/account representatives for EF information for these units. Where no response was provided by a company representative, the hardcopy EIQ was searched for information that may have lead to an inferred EF. See Table D.19 for the file name of the control packet developed as the result of this survey project. Table D.26 is a summary of BPA NO_X reductions to estimate 2007 future year emissions. All existing Chapter 117 rule compliance dates for BPA are prior to 2007, so all 2007 CFs based on those Chapter 117 compliance EFs were modeled. No VOC reductions were modeled.

Table D.26: *BPA 3-County Modeled NO_X Emissions Reduction Summary for August 30*

BPA sources	**2000 NO_X OSD (tpd)[1]**	**2000 NO_X w/SI and Acid Rain (tpd)[2]**	**2007 Modeled NO_X w/Growth (tpd)[3]**	**2007 Modeled NO_X w/ Growth and Controls (tpd)**
EGU	26.4	34.9	42.7	25.5
NEGU	96.6	84.3	98.2	81.9
Total	123.0	119.2	140.9	107.4

[1] typical ozone season day (emissions directly from PSDB/STARS)
[2] This day includes a 12 tpd NO_X NEGU decrease due to Special Inventory reporting.
[3] Includes the banked emissions (put into NEGU), newly-permitted EGUs, excludes Special Inventory
NOTE: gridded vs. non-gridded emissions summaries may vary slightly

DFW
For the DFW 4-county area, a procedure very similar to the BPA approach was used to arrive at future case point source inventories. As with BPA, an EF survey was performed. Table D.27 summarizes the 2007 DFW NO_X emissions. No VOC reductions were modeled.

Table D.27: *DFW 4-County Modeled NO_X Emissions Reduction Summary for August 30*

DFW sources	**2000 NO_X OSD (tpd)[1]**	**2000 NO_X w/ Acid Rain (tpd)**	**2007 Modeled NO_X w/Growth (tpd)[2]**	**2007 Modeled NO_X w/ Growth and Controls (tpd)**
EGU	72.9	107.0	107.4	23.7
NEGU	6.9	6.9	18.3	13.1
Total	79.8	113.9	125.7	36.8

[1] typical ozone season day (emissions directly from PSDB/STARS)
[2] includes the banked emissions (put into NEGU) and the newly-permitted EGUs
NOTE: gridded vs. non-gridded emissions summaries may vary slightly

East Texas Point Source Controls
EGUs were controlled (1) in the 95 attainment counties of East Texas with SB7 reductions if they have SB7 allowances, or (2) in the 31 Chapter 117 "named affected counties" with Chapter 117 NO_X reductions, if they do not have SB7 allowances. The appropriate reduction method was

determined for each of the EGU accounts in Texas. The list of EGUs with SB7 allowances can be found at http://www.tnrcc.state.tx.us/permitting/airperm/banking/allowreg.htm and replicated below as Table D.28.

For East Texas SB7 accounts in the attainment counties, an average reduction necessary to comply with the 2007 EF was calculated and modeled, since SB7 allows trading among all of the East Texas accounts that have SB7 allowances. This East Texas average SB7 reduction from the year 2000, based on 2000Q3 ARPDB, was calculated and modeled to be 45%. The non-SB7 accounts in East Texas required reductions between 31% and 60%. Overall, the reductions in East Texas EGUs total 373.6 tpd. The reductions are represented in the control packet listed in Table D.19. Table D.29 represents the overall reductions modeled for East Texas.

Table D.28: *East Texas SB7 Allowances as of February 15, 2000*

Company	Account Number	Plant Name	County	Allowance	Pollutant
Brazos Electric Power Cooperative	PC-0005-T	North Texas	Parker	14	NOx
Bryan Municipal Electric System	BM-0010-I	Bryan	Brazos	73	NOx
Central Power and Light	CB-0008-C	E.S. Joslin	Calhoun	365	NOx
Central Power and Light	NE-0024-E	Barney M. Davis	Nueces	1206	NOx
Central Power and Light	NE-0025-C	Lon C. Hill	Nueces	1365	NOx
Central Power and Light	NE-0026-A	Nueces Bay	Nueces	1931	NOx
Central Power and Light	VC-0003-D	Victoria	Victoria	744	NOx
City of Austin	TH-0004-D	Decker Creek	Travis	637	NOx
City of Austin	TH-0006-W	Holly Street	Travis	378	NOx
City Public Service	BG-0057-U	O.W. Sommers	Bexar	1776	NOx
City Public Service	BG-0059-Q	Leon Creek	Bexar	30	NOx
City Public Service	BG-0186-I	V.H. Braunig	Bexar	956	NOx
City Public Service	BG-0187-G	W.B. Tuttle	Bexar	118	NOx
City Public Service	BG-0188-E	Mission Road	Bexar	19	NOx
Denton Municipal Utilities	DF-0012-T	Spencer	Denton	194	NOx
Entergy	MQ-0009-F	Lewis Creek	Montgomery	1645	NOx
Entergy	OC-0013-O	Sabine	Orange	4319	NOx
Garland Municipal Power and Light	CP-0026-M	Ray Olinger	Collin	394	NOx
Garland Municipal Power and Light	DB-0384-A	C.E. Newman	Dallas	14	NOx
Greenville Electric Utility System	HV-0023-K	Powerlane	Hunt	6	NOx
Houston Lighting and Power	CI-0012-D	Cedar Bayou	Chambers	1929	NOx
Houston Lighting and Power	FG-0020-V	W.A. Parish	Fort Bend	1536	NOx
Houston Lighting and Power	GB-0037-T	P.H. Robinson	Galveston	3928	NOx
Houston Lighting and Power	HG-0353-D	Greens Bayou	Harris	631	NOx
Houston Lighting and Power	HG-0354-B	Hiram O. Clarke	Harris	5	NOx
Houston Lighting and Power	HG-0355-W	Webster	Harris	518	NOx
Houston Lighting and Power	HG-0356-U	Deepwater	Harris	70	NOx
Houston Lighting and Power	HG-0357-S	T.H. Wharton	Harris	249	NOx
Houston Lighting and Power	HG-0383-Q	Sam Bertron	Harris	976	NOx
Lower Colorado River Authority	BC-0015-L	Sam Gideon	Bastrop	1344	NOx
Southwestern Electric Power Company	GJ-0043-K	Knox Lee	Gregg	728	NOx
Southwestern Electric Power Company	ME-0006-A	Wilkes	Marion	1196	NOx
Texas Utilities	CJ-0026-J	Stryker Creek	Cherokee	1533	NOx
Texas Utilities	CP-0065-C	Collin	Collin	181	NOx
Texas Utilities	DB-0249-H	Lake Hubbard	Dallas	1634	NOx

Company	Account Number	Plant Name	County	Allowance	Pollutant
Texas Utilities	DB-0250-W	Dallas	Dallas	0	NOx
Texas Utilities	DB-0249-H	North Lake	Dallas	1124	NOx
Texas Utilities	DB-0252-S	Mountain Creek	Dallas	1803	NOx
Texas Utilities	DB-0253-Q	Parkdale	Dallas	333	NOx
Texas Utilities	FB-0025-U	Valley	Fannin	2106	NOx
Texas Utilities	FI-0020-W	Big Brown	Freestone	5239	NOx
Texas Utilities	FI-0020-W	Big Brown	Freestone	51636	SO2
Texas Utilities	HM-0017-H	Trinidad	Henderson	425	NOx
Texas Utilities	HQ-0012-T	Decordova	Hood	2536	NOx
Texas Utilities	MB-0116-C	Tradinghouse	McLennan	3592	NOx
Texas Utilities	MB-0117-A	Lake Creek	McLennan	544	NOx
Texas Utilities	RE-0012-M	River Crest	Red River	0	NOx
Texas Utilities	TA-0352-I	Eagle Mountain	Tarrant	553	NOx
Texas Utilities	TA-0353-G	Handley	Tarrant	1427	NOx
Texas Utilities	TA-0354-E	North Main	Tarrant	0	NOx
Texas Utilities	TF-0013-B	Monticello	Titus	6041	NOx
Texas Utilities	TF-0013-B	Monticello	Titus	59547	SO2

Table D.29: *East Texas Attainment Counties Modeled NO_X Emissions Reduction Summary for August 30*

E TX sources	2000 NO_X OSD[1] (tpd)	2000 NO_X w/ Acid Rain (tpd)	2007 Modeled NO_X w/Growth[2] (tpd)	2007 Modeled NO_X w/ Growth and Controls[3] (tpd)
EGU	776.1	835.9	930.2	532.9
NEGU	382.5	382.5	408.2	385.3
Total	1158.6	1218.4	1338.4	918.2

[1] Typical ozone season day (emissions directly from PSDB/STARS)
[2] Includes TIPI-EGAS projections (put into NEGU) and the newly-permitted EGUs
[3] Includes the SB7/Ch117 EGU controls, the Midlothian kiln NEGU "controls", and NEGU Agreed Orders
NOTE: gridded vs. non-gridded emissions summaries may vary slightly

As noted in the growth discussion subsection above, the EGUs in East Texas were grown through the addition of newly-permitted EGUs. At least one EGU source reported only partial emissions in its 2000 EIQ, because the source was newly operational in 2000. Since these emissions would not be representative of the emissions a source would be emitting in the future, the 2000 EIQ emissions were zeroed out, via the control packet, "control.midlothian.energy", as represented in Table D.19. Then the permit allowable emissions were modeled via the new EGU AFS file identified in Table D.19.

Table D.30, below, lists the sources that were affected by recent agreed orders and consent decrees. The control packets and AFS file reflecting these changes dictated by these Agreed

Orders and the Consent Decree are given in Table D.19. These reductions totaled 23 tpd in East Texas and are also accounted for in Table D.29, above.

Table D.30: *Sources Affected by Agreed Orders and Consent Decrees*

Source	Number	Date	Implementation	Link
Eastman Chemical Co.	2000-0033-SIP	2000	Apr 2000-July 2002	http://www.tnrcc.state.tx.us/oprd/rule_lib/4regapb.pdf
Eastman Chemical Co.	2001-0880-RUL	2001	Apr 2002-May 2003	http://www.tnrcc.state.tx.us/oprd/sips/01026sip-eastman.pdf
Alcoa	Consent Decree fr24ap03-81	2003	2006 - 2007	http://www.epa.gov/compliance/resources/cases/civil/caa/alcoafs.pdf http://www.epa.gov/fedrgstr/EPA-AIR/2003/April/Day-24/a10081.htm http://www.usdoj.gov/opa/pr/2003/April/03_enrd_215.htm

West Texas Point Source Controls

As with East Texas, in the attainment counties of West Texas, EGUs were controlled with (1) SB7 reductions if they have SB7 allowances, or (2) Chapter 117 NO_X reductions, if they do not have SB7 allowances. The list of EGUs in West Texas with SB7 allowances can be found in Table D.31 and at http://www.tnrcc.state.tx.us/permitting/airperm/banking/allowreg.htm .

For West Texas SB7 accounts, an average reduction necessary to comply with the 2007 EF was calculated and modeled, since SB7 allows trading among all of the West Texas accounts with SB7 allowances (see Table D.31). This West Texas average SB7 reduction from the year 2000, based on 2000Q3 ARPDB, was calculated and modeled to be 49%. The non-SB7 accounts in West Texas required reductions between 28% and 43%. Overall, the reductions in the West Texas EGUs in the modeling domain total 62.9 tpd. The reductions are represented in the control packet listed in Table D.19. No other reductions were modeled for West Texas. Table D.32 represents the overall reductions modeled for West Texas.

Table D.31: *West Texas SB7 Allowances as of February 15, 2000*

Company	Account Number	Plant Name	County	Allowance	Pollutant
Brazos Electric Power Cooperative	PA-0003-W	R.W. Miller	Palo Pinto	657	NOx
Central Power and Light	CD-0005-K	La Palma	Cameron	826	NOx
Central Power and Light	HN-0013-E	J.L. Bates	Hidalgo	368	NOx
Central Power and Light	WE-0005-G	Laredo	Webb	166	NOx
Lower Colorado River Authority	LL-0006-O	T.C. Ferguson	Llano	1036	NOx
Lubbock Power and Light	LN-0057-V	Holly Avenue	Lubbock	252	NOx
Southwestern Public Services Company	LB-0046-P	Plant X	Lamb	712	NOx
Southwestern Public Services Company	LN-0081-B	Jones	Lubbock	2044	NOx
Southwestern Public Services Company	MR-0033-U	Moore County	Moore	59	NOx
Southwestern Public Services Company	PG-0040-T	Nichols	Potter	1326	NOx
Texas Utilities	MO-0014-L	Morgan Creek	Mitchell	2772	NOx
Texas Utilities	WC-0028-Q	Permian Basin	Ward	2923	NOx
Texas Utilities	YB-0017-V	Graham	Young	2141	NOx
West Texas Utilities Company	CN-0005-T	Oak Creek	Coke	391	NOx
West Texas Utilities Company	CZ-0017-A	Rio Pecos	Crockett	537	NOx
West Texas Utilities Company	HE-0013-G	Lake Pauline	Hardeman	2	NOx
West Texas Utilities Company	HJ-0013-E	Paint Creek	Haskell	157	NOx
West Texas Utilities Company	JI-0030-K	Fort Phantom	Jack	565	NOx
West Texas Utilities Company	PE-0259-K	Fort Stockton	Pecos	0	NOx
West Texas Utilities Company	PH-0005-K	Presidio	Presidio	0	NOx
West Texas Utilities Company	TB-0056-E	Abilene	Taylor	0	NOx
West Texas Utilities Company	TG-0044-C	San Angelo	Tom Green	1094	NOx
West Texas Utilities Company	WI-0002-O	Vernon	Wilbarger	0	NOx

Table D.32: *West Texas Attainment Counties (within the Modeling Domain) Modeled NO_X Emissions Reduction Summary for August 30*

W TX sources	2000 NO_X w/ Acid Rain (tpd)	2007 Modeled NO_X w/Growth[1] (tpd)	2007 Modeled NO_X w/ Growth and Controls (tpd)
EGU	144.7	149.0	85.0
NEGU	116.6	117.7	117.6
Total	261.3	266.7	202.6

[1] Includes TIPI-EGAS projections (put into NEGU) and the newly-permitted EGUs
NOTE: gridded vs. non-gridded emissions summaries may vary slightly

Future Case Tile Plots

Figures D.16 and D.17 are point source NO_X and CB-IV HC emissions tile plots for the HGB modeling subdomain for the August 30 future case.

Figure 16: *HGB Subdomain Future Case Point Source NO_X Tile Plot*

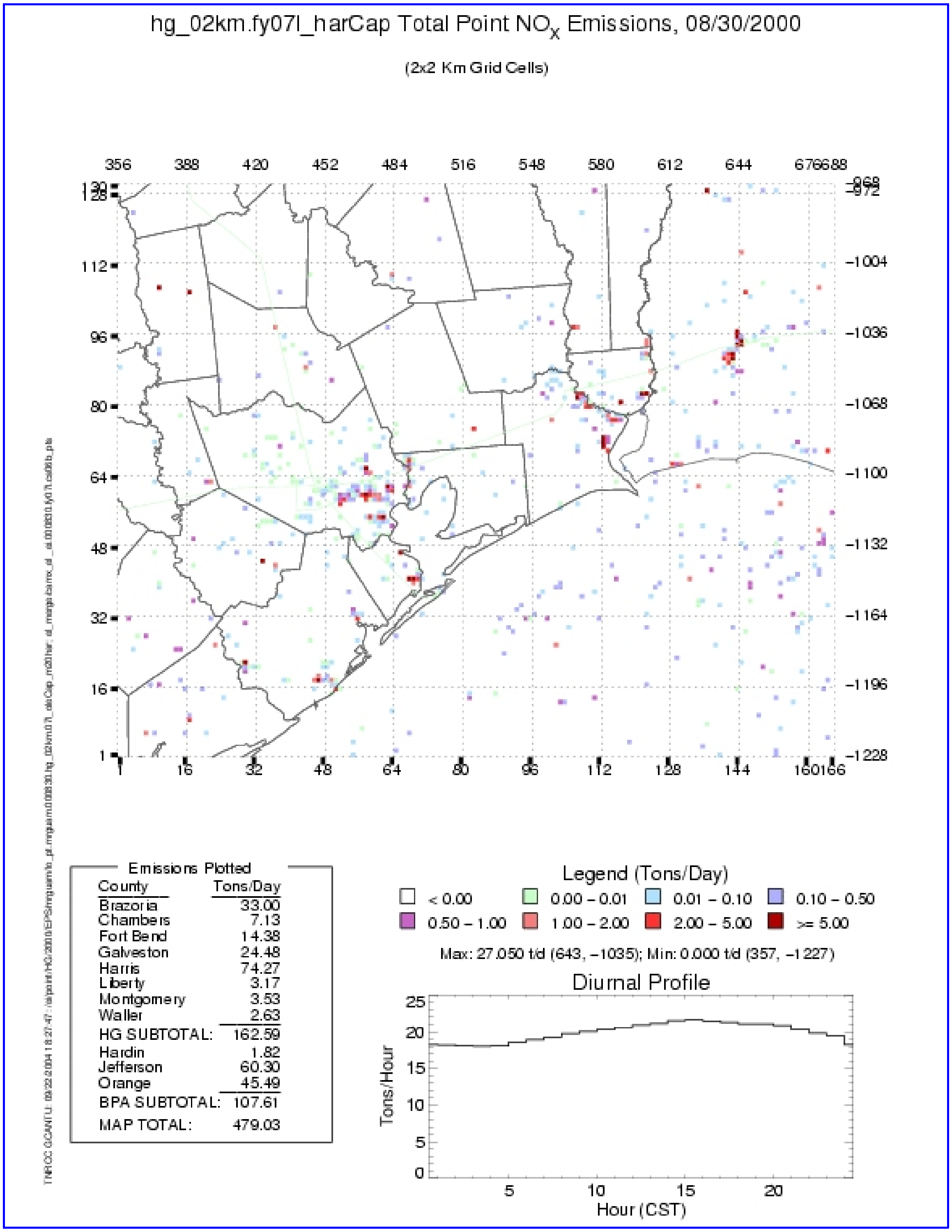


Figure 17: *HGB Subdomain Adjusted Future Case Point Source CB-IV HC Tile Plot*